5-4310-221-15

TM 5-4310-221-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, FIELD, AND DEPOT MAINTENANCE MANUAL

COMPRESSOR, ROTARY, AIR

SKID MOUNTED, GASOLINE DRIVEN
125 CFM, 100 PSI

(INGERSOLL-RAND MODEL GER-125)
SERIAL NOS. 125CR22346 THRU 125CR22545
AND 125CR24901 THRU 125CR25400
FSN 4310-818-9824

This copy is a reprint which includes current pages from Changes 1 and 3 through 5.

HEADQUARTERS, DEPARTMENT OF THE ARMY
MAY 1963

D 101. 11:

READEX FICHE best copy available

SAFETY PRECAUTIONS

BEFORE OPERATION

Provide sufficient ventilation. Exhaust gases contain carbon monoxide which is a colorless, odorless, and deadly poison.

Use extreme care in maintaining the air compressor. Be sure that no tools or other objects are left on the engine or air compressor, or against the drive mechanism.

When filling the fuel tank, always provide a metal-to-metal contact between the fuel container and fuel tank. This will prevent a spark from being generated as gasoline flows over metallic surfaces.

When servicing batteries, do not smoke or allow open flame nearby. Batteries generate hydrogen, a highly explosive gas.

DURING OPERATION

Do not remove any guards, shields, or screens while the compressor is operating.

Do not lubricate or adjust any assembly or part while the air compressor is operating.

Do not play with compressed air. Pressurized air can cause serious injury to personnel.

Do not fill the gasoline tank while the engine is running.

Exhaust all compressed air before loosening or removing any portion of the pressure system.

Check the pressure gage regularly to be sure the unloader and safety valve are working properly.

Care must be taken not to touch the muffler or cooling fins with bare hands. Severe burns could result from carelessness.

When operating the compressor, be guided by the simple and fundamental rules of safety. Always take all the necessary precautions to insure the safety of others as well as yourself.

AFTER OPERATION

Avoid spilling gasoline on a hot engine as this may cause a fire. Always provide a metal-to-metal contact between the container and fuel tank. This will prevent a spark from being generated as gasoline flows over metallic surfaces.

Exhaust all compressed air before loosening or removing any portion of the pressure system.

Care must be taken not to touch the muffler or cooling fins with bare hands. Severe burns could result from carelessness while servicing a hot engine.

CHANGE No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *26 February 1965*

Operator, Organizational, Field and Depot Maintenance Manual

COMPRESSOR, ROTARY, AIR, SKID MOUNTED, GASOLINE DRIVEN, 125 CFM, 100 PSI
(INGERSOLL-RAND MODEL GER-125)
SERIAL NOS. 125CR22346 THRU 125CR22545 AND 125CR24901 THRU 125CR25400
(FSN 4310-818-9824)

TM 5-4310-221-15, 6 May 1963, is changed as follows.

Page 1, Table of Contents, chapter 3, section VIII.

Change page "41" to "40".

Page 3, paragraph 1.

d. (Superseded) The direct reporting, by the individual user, of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form will be completed in triplicate, using pencil, pen, or typewriter, and forwarded direct to the Commanding General, U. S. Army Mobility Equipment Center, ATTN: SNOME-MMP, Post Office Drawer 58, St. Louis, Mo. 63166.

Page 3, paragraph 3*a*, line 16.

Change "aid" to "air".

Page 17.

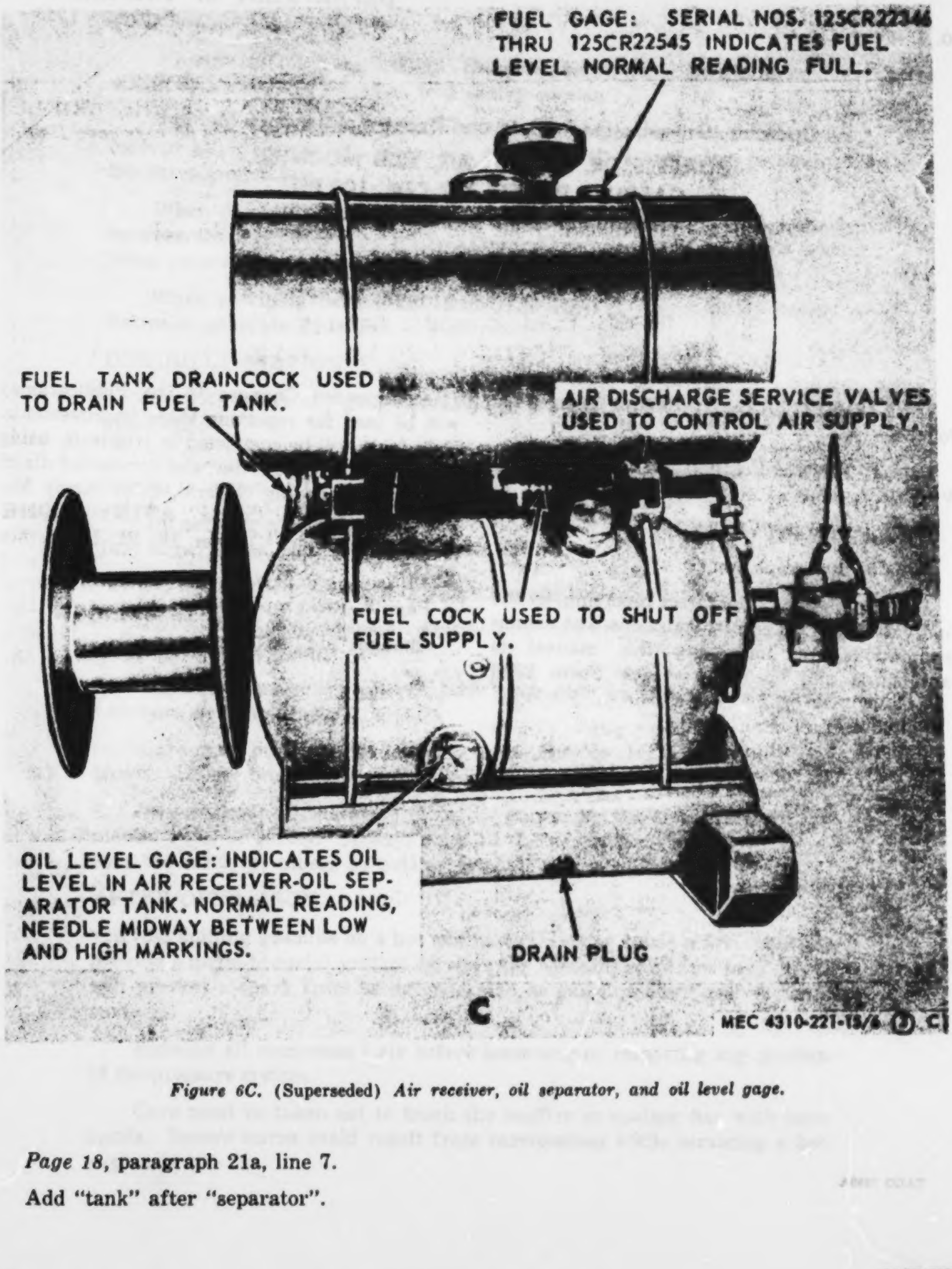

FUEL GAGE: SERIAL NOS. 125CR22346 THRU 125CR22545 INDICATES FUEL LEVEL NORMAL READING FULL.
FUEL TANK DRAINCOCK USED TO DRAIN FUEL TANK.
AIR DISCHARGE SERVICE VALVES USED TO CONTROL AIR SUPPLY.
FUEL COCK USED TO SHUT OFF FUEL SUPPLY.
OIL LEVEL GAGE: INDICATES OIL LEVEL IN AIR RECEIVER-OIL SEPARATOR TANK. NORMAL READING, NEEDLE MIDWAY BETWEEN LOW AND HIGH MARKINGS.
DRAIN PLUG
C
MEC 4310-221-15/6 (3) C

Figure 6C. (Superseded) *Air receiver, oil separator, and oil level gage.*

Page 18, paragraph 21a, line 7.

Add "tank" after "separator".

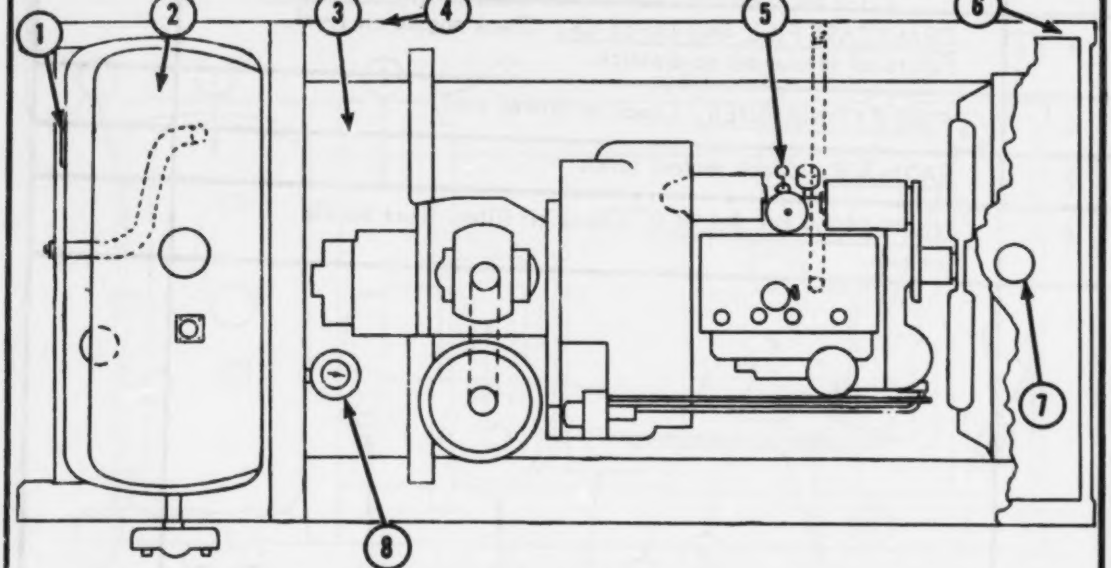
Page 29 and 30.

PREVENTIVE MAINTENANCE SERVICES

DAILY

TM 5-4310-221-15 COMPRESSOR

COMPRESSOR; INGERSOLL-RAND MODEL GER-125



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR. REF
1.	AIR RECEIVER-OIL SEPARATOR TANK AND OIL LEVEL GAGE. Check air receiver oil level. The oil level gage needle will be midway between low and high markings.	
2.	FUEL TANK. Check fuel level.	
3.	CONTROLS, INSTRUMENTS, GAGES, AND SWITCHES. Check for proper operation. Normal readings for instruments and gages are: Ammeter-charge area, On serial numbers 125CR24901 through 125CR25400 - green area; Engine oil pressure gage - 30 psi; Air interstage pressure gage -30 psi; Compressor oil temperature gage-170 F to 190 F; Air discharge pressure gage - 100 psi; Engine water temperature gage - 160 F to 180 F.	

MEC 4310-221-15/12 ① C1

Figure 12. (Superseded) *Daily preventive maintenance service.*

ITEM		PAR. REF
4	BATTERIES. Check electrolyte level. The electrolyte level must be 3/8 inch above plates. Check cables for hand tightness. Do not add water in freezing weather unless engine is to be operated immediately for one hour. (Weekly)	
5	CRANKCASE FILL AND DIPSTICK. Check engine oil level. Fill to oil level mark on dipstick.	
6	FIRE EXTINGUISHER. Check for broken seal.	
7	RADIATOR. Check coolant level.	
8	COMPRESSOR OIL FILTER. Check oil filter. Turn handle one turn.	

MEC 4310-221-15/12 ② C1

Figure 12. (Superseded)—Continued.

Page 31, 32, and 33.

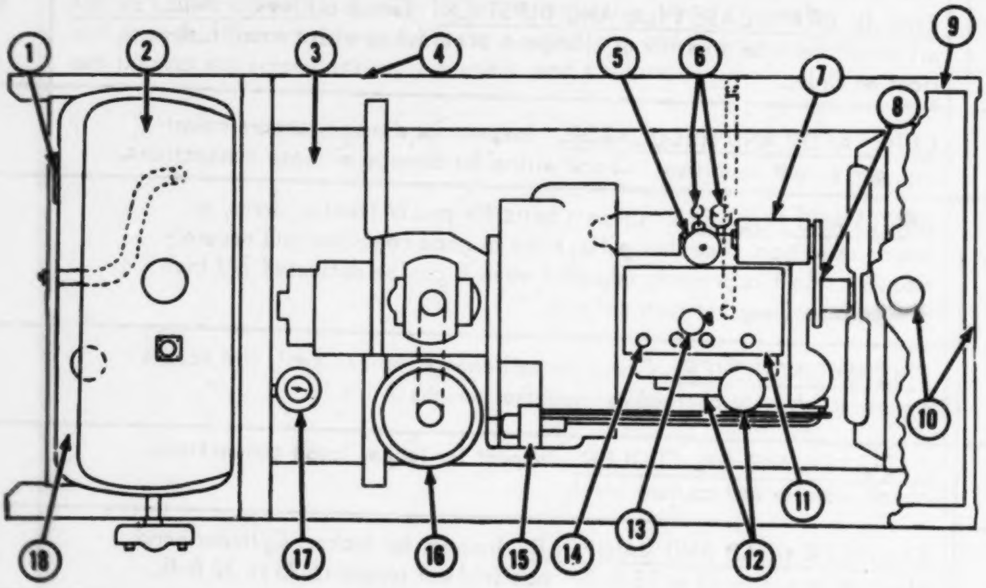
PREVENTIVE MAINTENANCE SERVICES

QUARTERLY

TM 5-4310-221-15

COMPRESSOR

COMPRESSOR, INGERSOLL-RAND MODEL GER-125



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1.	AIR RECEIVER-OIL SEPARATOR TANK AND OIL LEVEL GAGE. Check oil level. The needle will be midway between low and high markings. Add or change oil in accordance with current lubrication order.	
2.	FUEL TANK. Inspect for loose mounting hardware and connections. Inspect fuel lines and valve for leaks. Check fuel level.	
3.	CONTROLS, INSTRUMENTS, GAGES, AND SWITCHES. Inspect for cracked lens, broken, bare, or frayed wires, secure mounting, and proper operation. Normal readings for instruments are: Ammeter-charge area, On serial numbers 125CR24901 through 125CR25400-green area; Engine oil pressure gage-30psi; Air interstage pressure gage- 30 psi; Compressor oil temperature gage-170 F to 190 F; Air discharge pressure gage- 100 psi; Engine water temperature gage-160 F to 180 F.	

MEC 4310-221-15/13 ① C1

Figure 13. (Superseded) *Quarterly preventive maintenance services.*

ITEM		PAR REF
4.	BATTERIES AND CABLES. Inspect cables for hand tightness. Electrolyte level should be 3/8 inch above the plates. Do not add water to battery in freezing weather unless the engine is to be operated immediately for one hour.	
5.	ENGINE OIL FILTER. Inspect for leaks, damage, and secure mounting. Change filter element in accordance with current Lubrication Order.	
6.	ENGINE CRANKCASE FILL AND DIPSTICK. Check oil level. Add oil to full mark on dipstick or change in accordance with current Lubrication Order.	
7.	GENERATOR AND REGULATOR. Inspect for damage, secure mounting, and proper operation. Check wiring for damage or loose connections.	
8.	BELTS AND PULLEYS. Inspect belts for proper tension, wear, or frayed condition. See that pulleys are in good condition and securely mounted. Belt is properly adjusted when it can be deflected 1/2 inch at a point midway between pulleys.	
9.	FIRE EXTINGUISHER. Check for full charge, broken seal, and secure mounting. A fully charged extinguisher weighs 2-3/4 lb.	
10.	RADIATOR AND OIL COOLER. !nspect for leaks, loose connections, check radiator and coolant level.	
11.	CYLINDER HEAD AND MANIFOLD. Inspect for leaks. Cylinder-head stud nut torque is 70 to 75 ft-lb; manifold nut torque is 25 to 30 ft-lb.	
12.	CARBURETOR, FUEL PUMP, FILTER, AND LINES. Check for leaks and secure mounting. Clean fuel filter sediment bowl.	
13.	OVERSPEED GOVERNOR. Inspect for damage, secure mounting, and proper operation.	
14.	SPARK PLUGS AND CABLES. Inspect for loose connections and damage. Spark plug gap is 0.030 inch.	
15.	SPEED AND PRESSURE REGULATOR. Inspect for breaks, leaks, secure mounting, and proper adjustment.	

MEC 4310-221-15/13 ② C1

Figure 13. (Superseded)—Continued.

ITEM		PAR REF
16	ENGINE AND COMPRESSOR AIR CLEANER. Inspect for damage and secure mounting. Check oil level and condition of oil. Fill to oil cup level mark or change in accordance with current Lubrication Order.	
17	COMPRESSOR OIL FILTER. Inspect for leaks and secure mounting. Clean in accordance with current Lubrication Order.	
18	AIR RECEIVER TANK. Inspect for leaks, corrosion, secure mounting, and damage. Check air lines for loose connections and damage. Clean and inspect the screen assembly element, and strainer.	

MEC 4310-221-15/13 ③ C1

Figure 13. (Superseded)—Continued.

Page 51, paragraph 67*a*(4), line 1.

Change "Increace" to "Increase".

Page 52, paragraph 68*b*(1), line 1.

Change "Cleaning" to "Clean".

Page 65, paragraph 78*c*(2).

Change "Correct" to "Connect".

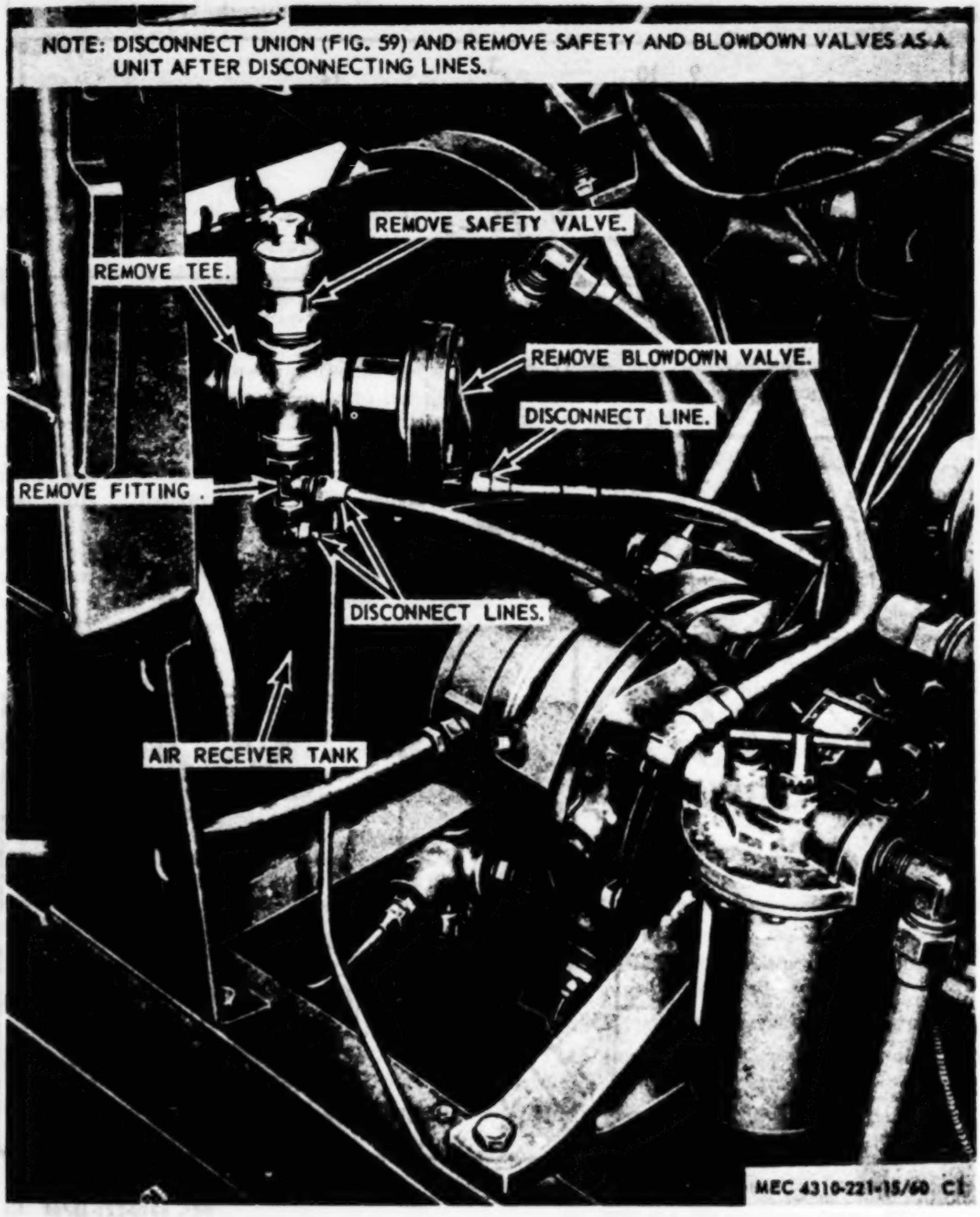
Page 81, paragraph 86*b*(2), lines 1 and 2.

Change "exhoust" to "exhaust".

Page 86, paragraph 94*a*(8), lines 1 and 2.

Change "instruced" to "instructed".

Page 98.


NOTE: DISCONNECT UNION (FIG. 59) AND REMOVE SAFETY AND BLOWDOWN VALVES AS A UNIT AFTER DISCONNECTING LINES.

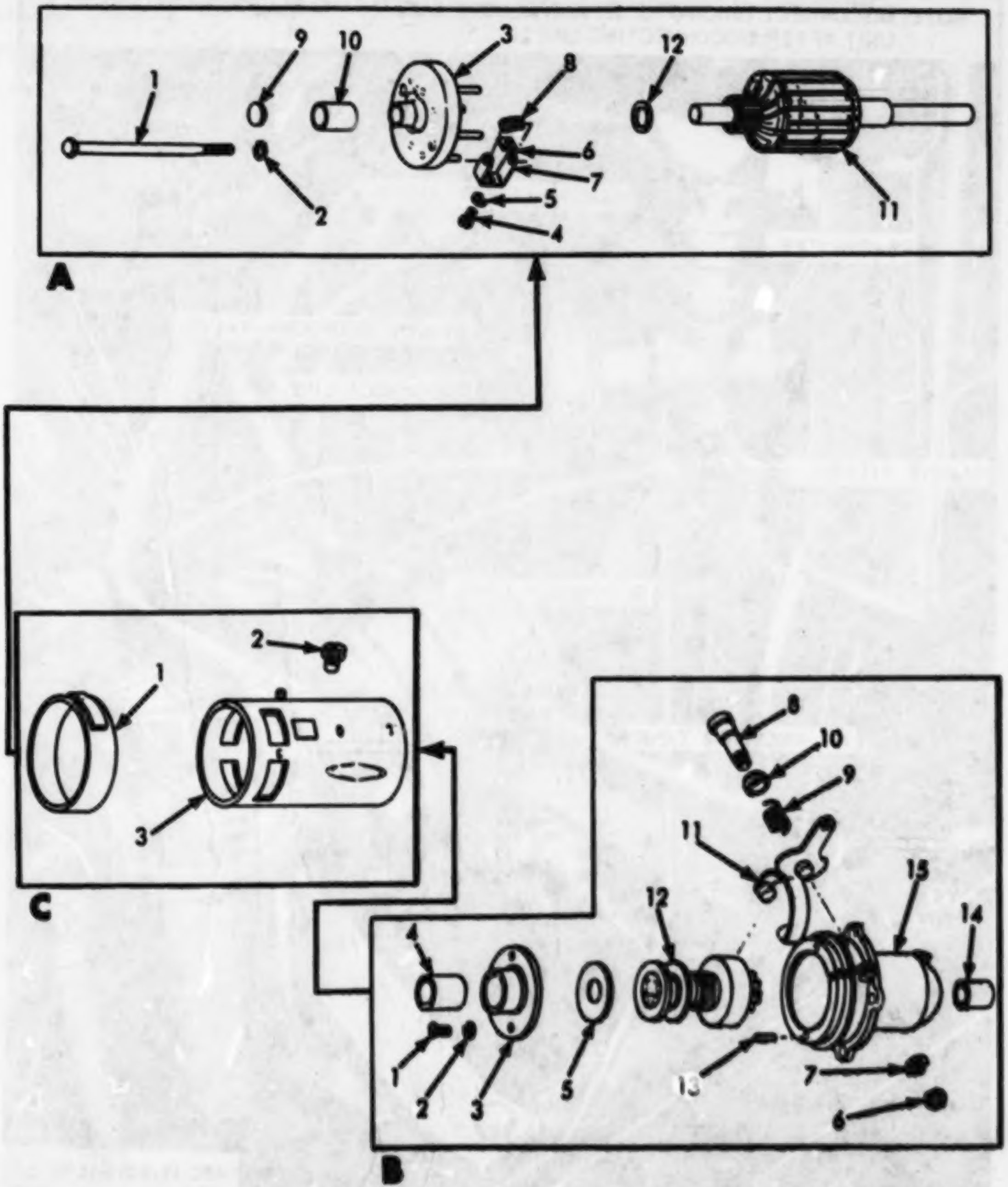
REMOVE SAFETY VALVE.
REMOVE TEE.
REMOVE BLOWDOWN VALVE.
DISCONNECT LINE.
REMOVE FITTING .
DISCONNECT LINES.
AIR RECEIVER TANK
MEC 4310-221-15/60 C1

Figure 60. (Superseded) *Safety and blowdown valves, removal and installation.*

Page 107, column 2, index 0612, line 3.

Change "cober" to "cover".

Page 119.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MEC 4310-221-15/66 C1

Figure 66. (*Superseded*) *Starter motor, exploded view.*

Page 131, paragraph 147c(1), line 3.

Change "illutsrated" to "illustrated".

Page 149.

Page 139, paragraph 157*b*(10), line 8.

Change "conecting" to "connecting."

Section XVII. AIR RECEIVER—OIL SEPARATOR TANK

(Superseded)

170. General

The air receiver—oil separator tank houses the oil separator assembly, the compressor oil level gage, and the filler cap. When the air leaving the high pressure stage of the compressor enters the air receiver tank, most of the oil drops to the bottom of the tank before the air enters the oil separator on its way to the discharge outlet. The oil temperature bypass valve, which is connected to the air receiver tank by tubing, allows compressor oil from the air receiver tank to bypass the oil cooler, when the oil is cold, and go directly through the compressor oil filter and oil pump back into the compressor. When the oil temperature rises, the valve closes the bypass line, directing the oil through the oil cooler before it enters the filter and oil pump. Servicing of the oil separator is by replacement of the element assembly.

Note. The element assembly of the oil separator is filled with a special material which is hand fitted in each section to a definite density. No one should attempt to replace this material since it may result in excessive back pressure, excessive water accumulation in the oil, and excessive oil consumption. Servicing the oil separator is by replacement of the element assembly. In normal operation, replacement of the element assembly will not be required for at least two years. The time for changing the element assembly is indicated by high oil consumption.

171. Air Receiver—Oil Separator Tank

a. Removal.

(1) Drain the oil from the air receiver—oil separator tank (para. 29.)

(2) Remove the fuel tank (para. 61).

(3) Remove the oil level gage (para. 80).

(4) Remove the high pressure discharge check valve (para. 136).

(5) Remove the service valves (para. 104).

(6) Remove the compressor oil temperature gage sending unit (para. 81).

(7) Remove the hose rack (para. 106).

(8) Remove the air receiver—oil separator tank as instructed by figure 89.

b. Dissembly. Disassemble the air receiver—oil separator tank in the numerical sequence as illustrated by figure 87.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent.

(2) Inspect all parts for breaks and damage. Replace defective parts.

(3) Inspect the air receiver—oil separator tank for rust, corrosion, stripped threads, and other damage. Replace defective air receiver—oil separator tank.

a. Reassembly. Reassemble the air receiver—oil separator tank in the reverse of the numerical sequence as illustrated by figure 87.

e. Installation.

(1) Install the air receiver—oil separator tank in reverse of instruction on figure 89.

(2) Install the compressor oil temperature gage sending unit (para. 81).

(3) Install the service valves (para. 104).

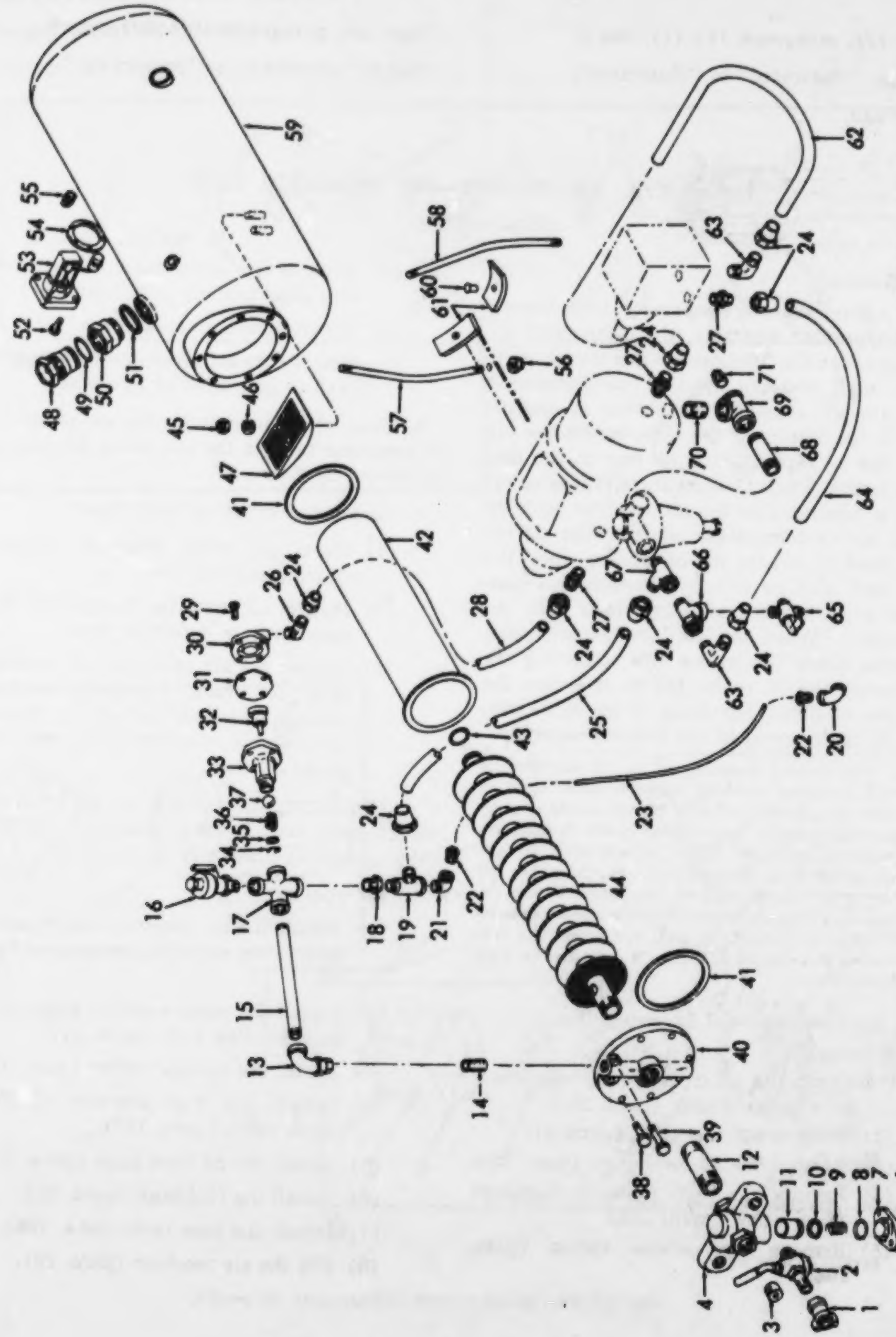
(4) Install the high-pressure discharge check valve (para. 136).

(5) Install the oil level gage (para. 80).

(6) Install the fuel tank (para. 61).

(7) Install the hose rack (para. 106).

(8) Fill the air receiver (para. 29).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MEC 4310-221-15/87 C1

1 Hose coupling
2 Service valve
3 Pipe plug
4 Valve body
5 Screw
6 Lockwasher
7 Cover
8 O-ring
9 Spring
10 Valve ring
11 Valve
12 Nipple, close
13 Union elbow
14 Nipple, close
15 Pipe nipple
16 Safety valve
17 Cross
18 Reducing bushing
19 Tee
20 Elbow
21 Street elbow
22 Tube nut
23 Tube (safety valve line to air discharge gage)
24 Tube nut
25 Tube (oil separator to reducing valve)
26 Elbow
27 Tube union
28 Tube (atmospheric relief valve from union)
29 Screw
30 Cover
31 Diaphragm
32 Piston
33 Body
34 Retaining ring
35 Washer
36 Spring
37 Ball
38 Screw, cap
39 Screw, cap
40 Cover
41 Gasket
42 Inner shell
43 O-ring
44 Screen assembly element
45 Nut
46 Lockwasher
47 Strainer
48 Oil filler plug
49 O-ring
50 Adapter
51 Gasket
52 Screw
53 Oil level gage
54 Gasket
55 Plug
56 Locknut
57 Strap, rear
58 Strap, front
59 Air receiver tank
60 Rivet
61 Cushion
62 Tube (unloader to regulator)
63 Elbow
64 Tube (reducing valve to regulator)
65 Drain cock
66 Tee
67 Tee
68 Nipple, pipe
69 Tee
70 Nipple, close
71 Plug, pipe

Figure 87. (Superseded) *Air receiver—oil separator tank, disassembly and reassembly.*

Page 153, section XIX. Deleted.

Page 155, figure 90. Deleted.

Page 158, paragraph 118.
Change "118" to "178."

Page 177, paragraph 4. Deleted.

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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USA Engr R&D Lab (3)
USA Mbl Equip Cen (56)
Engr Cen (5)
USAREUR Engr Proc Cen (2)
USAREUR Engr Sup Con Agcy (10)
Chicago Proc Ofc (10)
Engr Fld Maint Shops (2)
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MAAG (1)
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NG: State AG (3)

USAR: Same as Active Army except allowance is one (1) copy for each unit.

For explanation of abbreviations used, see AR 320-50.

Changes in Force: C 1 and C 3

TM 5-4310-221-15
*C 3

Change No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *11 September 1973*

Operator, Organizational, Field, and Depot Maintenance Manual
COMPRESSOR, ROTARY, AIR, SKID MOUNTED, GASOLINE DRIVEN, 125 CFM, 100 PSI (INGERSOLL-RAND MODEL GER-125) SERIAL NOS. 125CR22346 THRU 125CR22545 AND 125CR24901 THRU 125CR25400
FSN 4310-818-9824

TM 5-4310-221-15, 6 May 1963 is changed as follows:

Page 2. In the table of contents, Appendix III is superseded as follows:

APPENDIX III. BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Page 3. Paragraph 1 is superseded as follows:

1. Scope

a. This manual is for your use in operating and maintaining the compressor. It provides information on the operation, lubrication, preventive maintenance services, and maintenance of the equipment, its accessories, and components.

b. Numbers in parenthesis on illustrations indicate quantity.

Page 3. Paragraph 2 is superseded as follows:

2. Forms and Records

a. Maintenance forms and records that you are required to use are explained in TM 38-750.

b. You can improve this manual by calling attention to errors and by recommending improvements, using DA Form 2028 (Recommended Changes to Publications), or by letter, and mailing directly to Commander, U.S. Army Troop Support Command, ATTN: AMSTS-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120.

Page 11. Paragraph 7.1 is added after paragraph 7.

7.1. Maintenance and Operating Supplies

Refer to Table 0 for a complete list of maintenance and operating supplies required for initial operation of the compressor.

***This change supersedes C 2, 15 August 1969.**

Table 0. Maintenance and Operating Supplies

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required f/initial operation	(5) Quantity required f/8 hrs operation	(6) Notes
		OIL, LUBRICATING:			(1) See current LO for grade application and replenishment intervals.
AIR CLEANER	9150-242-7603 (2)	OES, 5 gal pail	1-3/4 qt	(1)	
			(3)		
	9150-582-5480	2210TH, 55 gal drum	3-1/2 qt		
AIR RECEIVER		OIL, LUBRICATING (4)	(3)		(2) For additional data on Federal Stock Numbers and requisitioning procedures see C9100IL.
		OIL, LUBRICATING:	5 gal	(1)	
CRANKCASE	9150-242-7603	OES	5-1/2 qt	(1)	
	9150-265-9428	OE-10	5-1/2 qt	(1)	
	9150-265-9435	OE-30	5-1/2 qt	(1)	
FUEL TANK	9130-160-1818	GASOLINE AUTOMOTIVE: bulk	24 gal (5)	25.76 gal (6)	(3) On serial Nos. 125CR22346 thru 125CR22545-1-3/4 qt. On serial nos 125CR24901 thru 125CR25400-3-1/2 qt
		WATER			
		ANTIFREEZE			
RADIATOR	6850-224-8730	Ehtylene glycol, 5 gal can	(7)	(8)	
	6850-174-1806	Compound Arctic, 55 gal drum	(7)	(8)	(4) Use oil as prescribed for air cleaner
		GREASE, AUTOMOTIVE AND ARTILLERY:			
TACHOMETER DRIVE	9150-190-0904	GAA, 1 lb can	as Required	(1)	(5) Tank capacity (6) Average fuel consumption is 3/22 gph of continuous operation. (7) Cooling system capacity (8) See table 1 for quantity, specific gravity and replenishment data.

***Page 164.* Appendix I is superseded as follows:**

APPENDIX I
REFERENCES

1. Fire Protection

TB 5-4200-200-10	**Hand Portable Fire Extinguishers for Army Users**

2. Painting

TM 9-213	Painting Instructions for Field Use

3. Lubrication

LO 5-4310-221-15	Lubrication Order for Compressor
C9100-IL	Fuels, Lubricants, Oils and Waxes

4. Radio Supression

TM 11-483	Radio Interference Suppression

5. Maintenance

TM 5-764	Electric Motor and Generator Repair
TM.5-4310-221-20P	Organizational Maintenance Repair Parts
TM 5-4310-221-35P	Field and Depot Maintenance Repair Parts
TM 9-207	Operation and Maintenance of Material in Extreme Cold Weather (0 to -65° F)
TM 9-6140-200-15	Storage Batteries, Lead Acid Type
TM 38-750	Army Equipment Record System and Procedures

6. Shipment and Storage

TB 740-93-2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage
TM 740-90-1	Administrative Storage of Equipment

Page 176. Appendix III is superseded as follows:

APPENDIX III
BASIC ISSUE ITEM LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

1. Scope

This appendix lists basic issue items, items troop installed or authorized which accompany the compressor and are required by the crew/operator for operation, installation or operator's maintenance.

2. General

This basic issue items, items troop installed or authorized list is divided into the following sections:

a. Basic Issue Items List—Section II. Not applicable.

b. Items Troop Installed or Authorized List—Section III. A list in alphabetical sequence of items which, at the discretion of the unit commander, may accompany the end item, but are NOT subject to be turned in with the end item.

3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II, and Items Troop Installed or Authorized, Section III.

a. Source, Maintenance, and Recoverability Code(s) (SMR): Not applicable.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A 2-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Authorized (Items Troop Installed or Authorized Only). This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock No.	(3) Description Ref. No. & Mfr code	Usable on code	(4) Unit of meas	(5) Qty auth
	4210-555-8837	EXTINGUISHER, FIRE		EA	1
	4720-202-6948	HOSE ASSEMBLY W/COUPLINGS		EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, (qty rqr block no. 34) Organizational maintenance requirements for Air Compressor, 100 CFM.

Changes in Force: C 1, C 3 and C 4

TM 5-4310-221-15
C 4

CHANGE }
No. 4 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *14 June 1974*

Operator, Organizational, Direct and General Support and Depot Maintenance Manual FOR COMPRESSOR, ROTARY, AIR, SKID MOUNTED, GASOLINE DRIVEN, 125 CFM, 100 PSI (INGERSOLL-RAND MODEL GER-125) SERIAL NOS. 125CR22346 THRU 125CR22545 AND 125CR24901 THRU 125CR25400 FSN 4310-818-9824

Tm 5-4310-221-15, dated 6 May 1963, is changed as follows:
Inside Front Cover, add the following:

WARNING

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained perfessional. See TB MED 251."

WARNING

Dry cleaning solvent, PD-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 138°F (38°C - 59°C°).

Page 164. Paragraph 6, add the following:
"TB MED 251 Noise and Conversation of hearing."

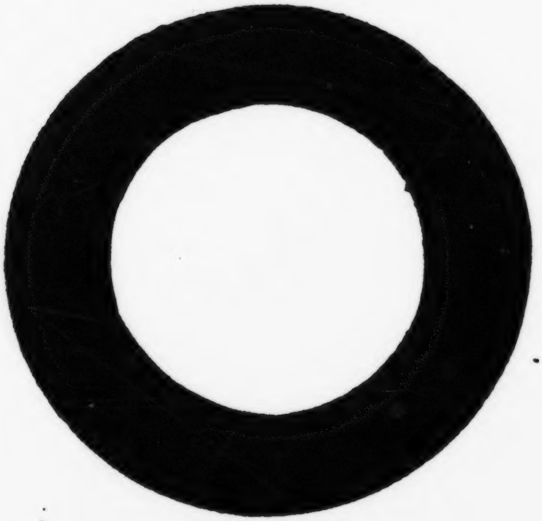
By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A (qty rqr block No. 34) Operator's Maintenance requirements for Air Compressor: 100 CFM.



Changes in Force: C1, C3, C4 and C5

TM 5-4310-221-15
C 5

CHANGE
NO. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C.,

Operator, Organizational, Direct and General Support and Depot Maintenance Manual

COMPRESSOR, ROTARY, AIR, SKID MOUNTED, GASOLINE DRIVEN, 125 CFM, 100 PSI (INGERSOLL-RAND MODEL GER-125) SERIAL NOS. 125CR22346 THRU 125CR22545 AND 125CR24901 THRU 125CR25400
NSN 4310-00-818-9824

TM 5-4310-221-15, 6 May 1963, is changed as follows:

Throughout this manual all references to TM 38-750 is changed to read DA Pam 738-750, and also FSNs are changed to NSNs by adding two zeros after Federal Supply Classification (FSC).

Page 3. Paragraph 2 is superseded as follows:

"2. Forms and Records.

a. Maintenance forms and records that you are required to use are explained in DA PAM 738-750.

b. You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), to: Commander, U.S. Army Troop Support Command, ATTN: DRSTR-MPS, 4300 Goodfellow Boulevard, St. Louis, MO 63120. A reply will be furnished directly to you."

Pages 29 through 33, Preventive Maintenance Services, Daily and Prevementive Maintenance, Quarterly (Figures 12 and 13) are superseded by "Figure 12. Operator/Crew Preventive Maintenance Checks and Services" "Figure 13. Organizational Preventive Maintenance Checks and Services."

Page 164, Appendix I, References. Paragraph 6 "TM 38-750 The Army Equipment Records System and Procedures" is changed to read "DA PAM 738-750 The Army Maintenance Management System (TAMMS)."

	INTERVAL			B-BEFORE OPERATION D-DURING OPERATION	A-AFTER OPERATION	
ITEM NO.	B	D	A	ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	EQUIPMENT IS NOT READY/ AVAILABLE IF:
1	●			Air Compressor	Visually inspect the unit for fuel, oil, and coolant leaks. Check engine and compressor oil levels (fig. 8 and 6C) and fire extinguisher.	Leakage is detected during inspection.
2		●		Controls and instruments	Instruments shall indicate within specified limits. (para 14, fig. 6A and 6B)	
				a. Battery charging ammeter	Green area or charge area, depending on type of gage.	Ammeter does not indicate within green or charge area.
				b. Fuel level gage	Check for sufficient fuel for continued operation.	
				c. Engine oil pressure gage	30 psi.	Pressure is below 20 psi.
				d. Coolant temperature gage	160 to 180°F.	Temperature exceeds 200°F.
				e. Air interstage pressure gage	30 psi.	Pressure cannot be maintained.
				f. Compressor oil temperature gage	170 to 190°F.	Temperature exceeds 200°F.
				g. Air discharge pressure gage	100 psi.	Pressure cannot be maintained.
				h. Tachometer-hourmeter	800 rpm idle 2100 rpm under load	Engine rpm cannot be sustained high enough to maintain proper discharge pressure.
3			●	Fuel tank	Fill fuel tank after completion of daily operation.	

Figure 12. Operator/Crew Preventive Maintenance Checks and Services

	INTERVAL			W-WEEKLY (40 HOURS) M-MONTHLY (100 HOURS)	H-HOURS (AS INDICATED)	
ITEM NO.	W	M	H	ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	EQUIPMENT IS NOT READY/ AVAILABLE IF:
1	●			Coolant level	Check coolant level and replenish as necessary. Proper level is 2 inches below cap.	
2	●			Compressor oil filter	Turn "T" handle on top of oil filter one complete turn. Remove drain plug and drain sediment from canister (fig. 11).	
3		●		Fuel tank	Drain water and sediment from fuel tank (fig. 6c). NOTE In freezing weather, tank should be drained shortly after operation. Close drain cock as soon as clean fuel begins to run out.	
4		●		Fuel sediment bowl	Remove and clean fuel sediment bowl (fig. 18A and 18B).	
5		●		Batteries	Check battery electrolyte level. Perform a hydrometer check of battery electrolyte. Recharge or replace a low battery. Add water if necessary to bring to proper level, 3/8 inch above plates (para 65c).	
6		●		Air compressor	Inspect the unit for loose, damaged, or missing parts; and unusual wear or deterioration. Clean unit as necessary.	
7		●		V-Belt	Adjust V-belt as necessary. Proper adjustment is a belt deflection of 1/2 inch midway between pulleys (fig. 25).	
8		●		Engine and compressor	Remove air cleaner oil cup. Drain, clean ,and refill with clean oil (para 63).	

Figure 13. Organizational Preventive Maintenance Checks and Services (Sheet 1 of 2)

	INTERVAL			W-WEEKLY (40 HOURS) M-MONTHLY (100 HOURS)	H-HOURS (AS INDICATED)	
ITEM NO.	W	M	H	ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	EQUIPMENT IS NOT READY/ AVAILABLE IF:
9			300	Engine crankcase	Drain and refill engine oil every 300 hours or 6 months.	
10			300	Engine oil filter	Replace engine oil filter every 300 hours or 6 months (para 89).	
11			300	Air receiver oil separator	Drain and refill the compressor lubricating system every 300 hours or 6 months.	
12			300	Compressor oil filter	Remove and clean compressor oil filter every 300 hours or 6 months (para 98).	

Figure 13. Organizational Preventive Maintenance Checks and Services (Sheet 2 of 2)

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25A, Operator Maintenance Requirements for Air Compressor: 100 CFM.

*TM 5-4310-221-15

TECHNICAL MANUAL
No. 5-4310-221-15

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., *6 May 1963*

OPERATOR, ORGANIZATIONAL, FIELD, AND DEPOT MAINTENANCE MANUAL

COMPRESSOR, ROTARY: AIR, SKID MOUNTED; GASOLINE DRIVEN; 125 CFM; 100 PSI (INGERSOLL-RAND MODEL GER-125) SERIAL NUMBERS 125CR22346 THROUGH 125CR22545 AND 125CR24901 THROUGH 125CR25400

FSN: 4310-818-9824

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* This manual supersedes TM 5-4310-221-15, 25 September 1961.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual is published for the use of the personnel to whom the Ingersoll-Rand Model GER-125 Gasoline Driven Air Compressor is issued. Chapters 1 through 5 provide information on the operation, daily preventive maintenance services, and organizational maintenance of the equipment, accessories, components, and attachments. Chapter 6 provides information on field and depot maintenance (3d, 4th, and 5th echelons). This manual also provides descriptions of the main units and their functions in relationship to other components.

b. Appendix I contains a list of publications applicable to this manual. Appendix II contains the Maintenance Allocation Chart. Appendix III contains the list of Basic Issue Items authorized the operator of this equipment. The Organizational, Field, and Depot Maintenance Repair Parts and Special Tool Lists are listed in TM 5-4310-221-20P and TM 5-4310-221-35P.

c. Numbers in parentheses on illustrations indicate quantity. Numbers preceding nomenclature callouts on illustrations indicate the preferred maintenance sequence.

d. Report all deficiencies in this manual on DA Form 2028. Submit recommendations for changes, additions, or deletions to the Commanding Officer, U.S. Army Mobility Support Center, ATTN: SMOMS-MS, P.O. Box 119, Columbus 6, Ohio. Direct communication is authorized.

e. Report all equipment improvement recommendations as prescribed by TM 38-750.

2. Record and Report Forms

DA Form 2258	Depreservation Guide of Engineer Equipment.

For other record and report forms applicable to the operator and organizational maintenance, refer to TM 38-750.

Note. Applicable forms, excluding standard Form 46 which is carried by the operator, shall be kept in a canvas bag mounted on the equipment.

Section II. DESCRIPTION AND DATA

3. Description

a. General. The Ingersoll-Rand Compressor, Model GER-125 (figs. 1 and 2) is driven by a Continental Model FS-162 Gasoline Engine. The compressor and engine are completely inclosed in a housing with hinged side panels for access to the engine, compressor, controls, and instruments. The engine, compressor, housing, and receiver are mounted on a welded-steel channel frame. The compressor frame is mounted on the skid. A speed and pressure regulator, along with a volumetric regulator, provides near-perfect regulation of the compressor operation. The compressor is lubricated by oil circulated in the compressed air throughout the unit. All oil is removed from the aid by an oil separator before the compressed air enters the air service lines.

b. Compressor. The Ingersoll-Rand compressor assembly, Model GER-125, is a two-stage, sliding vane, rotary, oil-cooled compressor. Its rated output is 125 cubic feet per minute at 100 pounds per square inch.

c. Engine. The Model FS-162 Continental Engine is a 4-cylinder, 4-cycle, L-head, liquid-cooled, gasoline engine designed to use military standard, interchangeable, high-mortality service parts.

d. Housing Assembly. The compressor unit is completely covered with a one-piece sheet metal cover bolted to the radiator top tank and the rear cowling. Two side covers are hinged

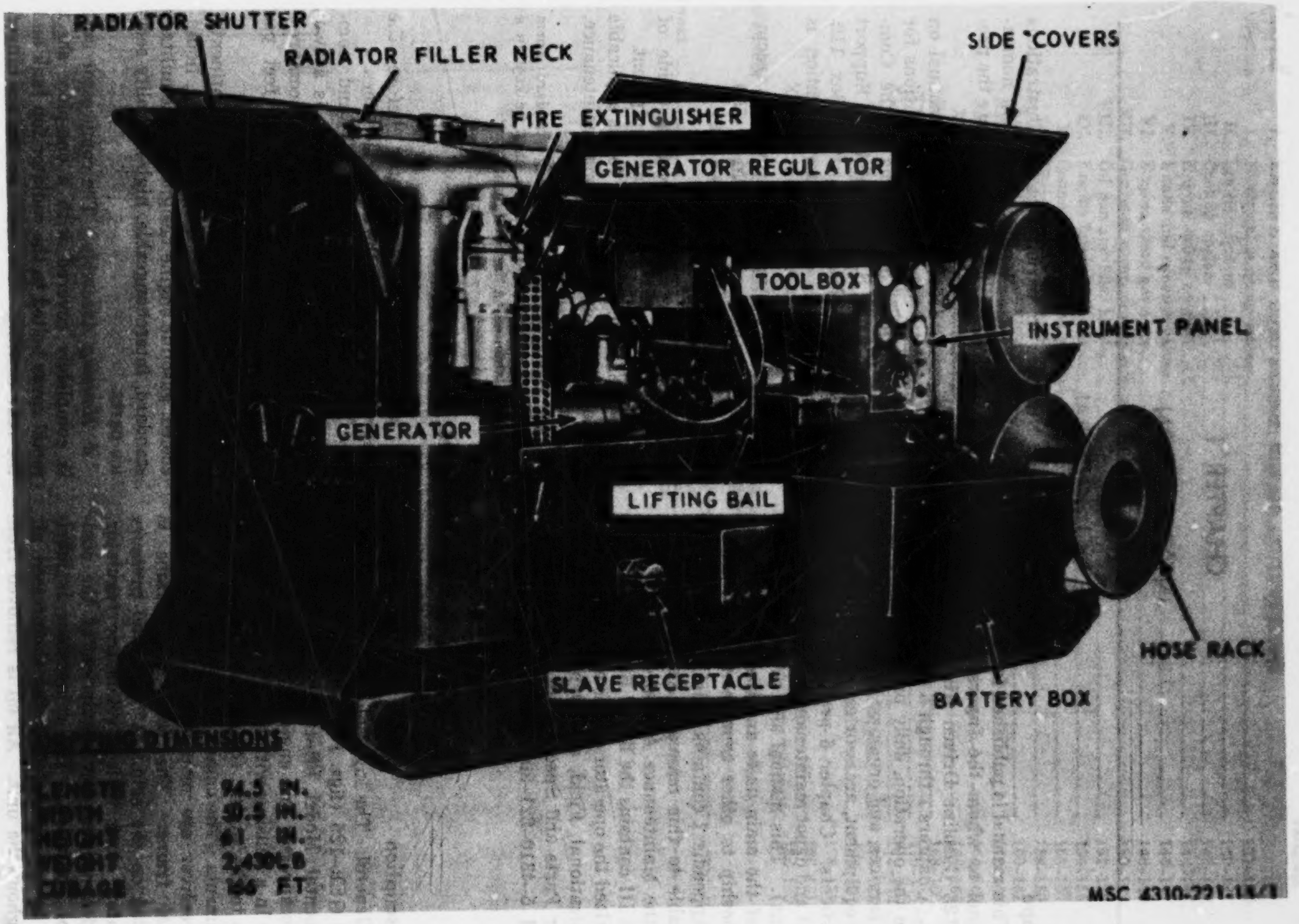

RADIATOR SHUTTER
RADIATOR FILLER NECK
FIRE EXTINGUISHER
GENERATOR REGULATOR
SIDE COVERS
TOOLBOX
INSTRUMENT PANEL
GENERATOR
LIFTING BAIL
SLAVE RECEPTACLE
BATTERY BOX
HOSE RACK
SHIPPING DIMENSIONS
LENGTH 94.5 IN.
WIDTH 50.5 IN.
HEIGHT 61 IN.
WEIGHT 2,430LB
CUBAGE 166 FT
MSC 4310-221-15/1

Figure 1. Air compressor, left-side view, cover open and shipping dimensions. (serial Nos. 125CR22346 through 125CR22545).

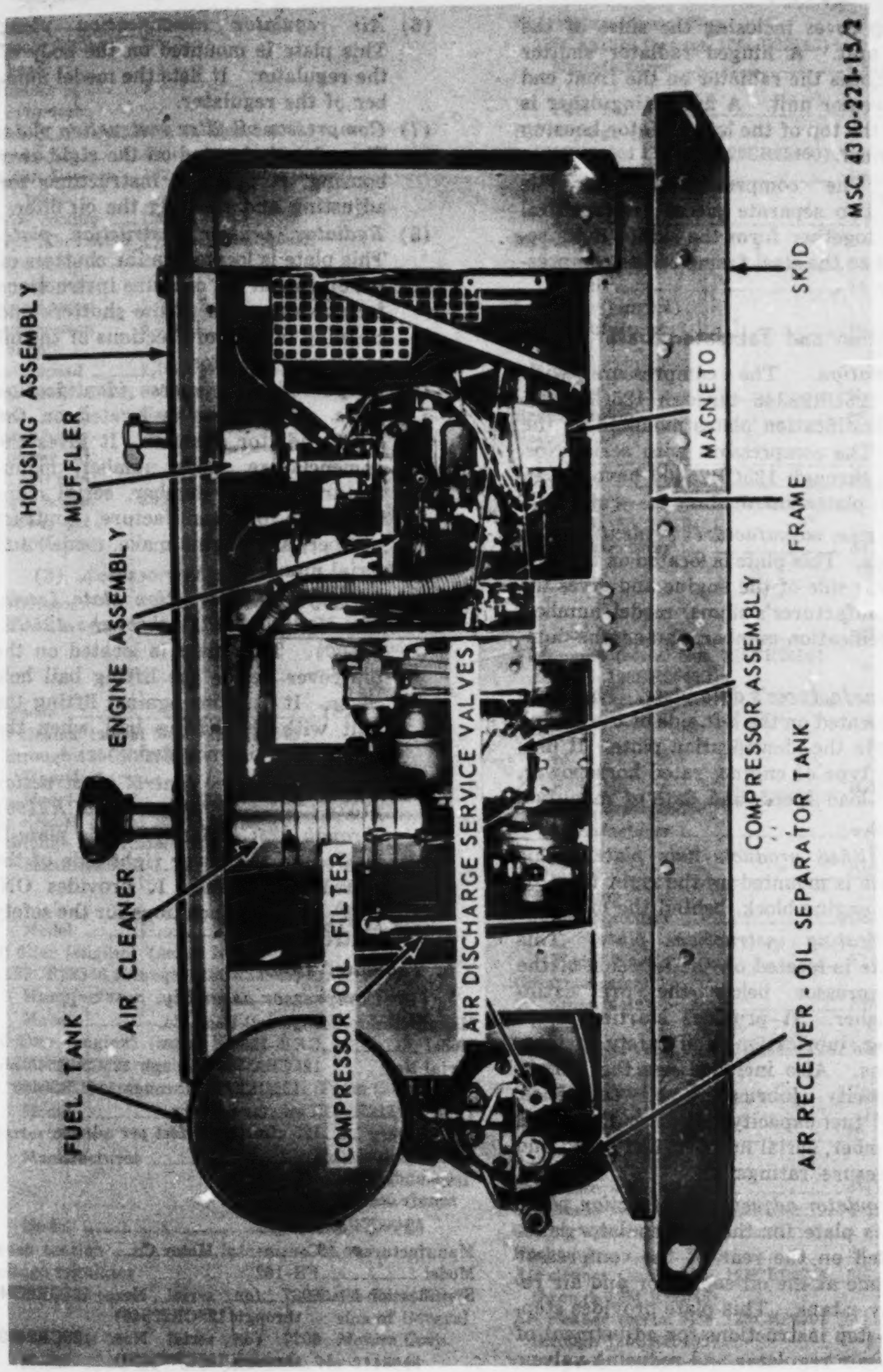

HOUSING ASSEMBLY
MUFFLER
ENGINE ASSEMBLY
AIR CLEANER
FUEL TANK
COMPRESSOR OIL FILTER
AIR DISCHARGE SERVICE VALVES
AIR RECEIVER - OIL SEPARATOR TANK
COMPRESSOR ASSEMBLY
FRAME
MAGNETO
SKID
MSC 4310-221-15/2

Figure 2. Air compressor, right-side view, side covers removed, (serial Nos. 125CR22546 through 125CR22545).

from the top cover inclosing the sides of the compressor unit. A hinged radiator shutter assembly incloses the radiator on the front end of the compressor unit. A fire extinguisher is provided on the top of the left radiator housing support channel.

e. Skid. The compressor assembly is mounted on two separate pieces of structural steel, which together form the skid. Bolts secure the skid to the steel frame of the compressor assembly.

4. Identification and Tabulated Data

a. Identification. The compressors with serial Nos. 125CR22346 through 125CR22545 have nine identification plates mounted on the equipment. The compressors with serial Nos. 125CR24901 through 125CR25400 have eleven identification plates mounted on the equipment.

(1) *Engine manufacturer's identification plate.* This plate is located on the left-lower side of the engine and gives the manufacturer's name, model number, specification number, and engine number.

(2) *Manufacturer's data plate.* This plate is located on the left side of the engine above the identification plate. It lists the type of engine, rated horsepower, full-load speed, and date of manufacture.

(3) *Qualified products lists plate.* This plate is mounted on the right front of the engine block, behind the magneto.

(4) *Operating instructions plate.* This plate is located on the left side of the compressor below the fire extinguisher. It provides starting, stopping, lubrication, and safety instructions. Also included are the coolant capacity, lubricating oil capacities, and fuel capacity. It gives the model number, serial number, and speed and pressure ratings.

(5) *Regulator adjusting instruction plate.* This plate for the air regulator is located on the rear of the compressor frame at the oil separator and air receiver tank. This plate provides step-by-step instructions for adjustment of the air regulator and reducing valve.

(6) *Air regulator identification plate.* This plate is mounted on the body of the regulator. It lists the model number of the regulator.

(7) *Compressor oil filter instruction plate.* This plate is located on the right-rear housing. It provides instructions for adjusting and cleaning the oil filter.

(8) *Radiator shutter instruction plate.* This plate is located on the shutters of the oil cooler. It contains instructions for the operation of the shutters and cleaning of the core sections of the oil cooler and radiator.

(9) *Corps of Engineers identification plate.* This plate is located on the right radiator channel. It gives the nomenclature, stock number, manufacturer, model number, serial number, date of manufacture, contract number, and engine make, model, and serial number.

(10) *Lifting bail instruction plate (serial Nos. 125CR24901 through 125CR-25400).* This plate is located on the top cover beside the lifting bail hole cover. It cautions against lifting the unit with the lifting bail when the compressor is mounted.

(11) *Engine safety control instruction plate (serial Nos. 125CR24901 through 125CR25400).* This plate is located on the lower right side of the instrument panel. It provides ON, OFF, and RUN positions for the sefety controls.

b. Tabulated Data.

(1) *Compressor assembly.*

Manufacturer	Ingersoll-Rand Co.
Model	GER-125
Serial No. ranges.	125CR22346 through 125CR22545 and 125CR24901 through 125CR25400
Type	Two-stage rotary
Air delivery	125 cfm (cubic feet per minute)
Maximum psi (pounds per square inch).	100

(2) *Engine.*

Manufacturer	Continental Motor Co.
Model	FS-162
Specification No.	6067 (on serial Nos. 125CR22346 through 125CR22545) 6077 (on serial Nos. 125CR24901 through 125CR25400)

Type	4 cycle
Type cylinder head.	L
Number of cylinders.	4
Bore	3$\frac{7}{16}$ in. (inches)
Stroke	4$\frac{3}{8}$ in.
Piston displacement.	162 cu in. (cubic inches)
Type cooling	Liquid
Type lubrication	Pressure and splash
Normal oil pressure.	20–30 psi
Firing order	1–3–4–2
Compression ratio.	6.3 to 1
Load speed	2,100 rpm (revolutions per minute)
Idle speed	800 rpm
Fuel	Gasoline
Rated horsepower (at 1,800 rpm).	27.7
Brake horsepower (at 1,800 rpm).	35.8

(3) *Accessory items.*

Carburetor:	
Manufacturer	Marvel-Schebler Products Div of Borg-Warner Corp.
Model	TSX816
Air cleaner (serial Nos. 125CR22346 through 125CR22545):	
Manufacturer	Vortox Co.
Model	G 80 AD
Air cleaner (serial Nos. 125CR24901 through 125CR25400):	
Manufacturer	Nichols Metals Mfg. Co. Incorporated
Model	KAX00–0378
Oil filter (engine) (serial Nos. 125CR22346 through 125CR22545):	
Manufacturer	Fram Corp.
Model	No. F3–POE
Oil filter (engine) (serial Nos. 125CR24901 through 125CR25400):	
Manufacturer	Fram Corp.
Model	No. F21P
Starter motor:	
Manufacturer	Delco-Remy Division of General Motors Corp.
Model	No. 1109947
Brush tension	24 oz.
Voltage regulator:	
Manufacturer	Delco-Remy Division of General Motors Corp.
Model	No. 1118644
Spark plugs (serial Nos. 125CR22346 through 125CR22545):	
Manufacturer	Champion Spark Plug Co.
Part No.	XED16
Spark plugs (serial Nos. 125CR24901 through 125CR25400):	
Manufacturer	Champion Spark Plug Co.
Part No.	XMD18
Magneto:	
Manufacturer	Slick Electro, Inc.
Model	54
Generator (engine):	
Manufacturer	Delco-Remy Division of General Motors Corp.
Model	No. 1105993
Brush tension	28 oz.
Battery:	
Volts	12
Polarity	Negative ground
Fuel pump (serial Nos. 125CR22346 through 125CR22545):	
Manufacturer	AC Spark Plug Division of General Motors Corp.
Part No.	1539970
Fuel pump (serial Nos. 125CR24901 through 125CR25400):	
Manufacturer	AC Spark Plug Division of General Motors Corp.
Part No.	1539837
Governor, overspeed:	
Manufacturer	Sychro-Start Products, Inc.
Model	GSM
Water pump:	
Manufacturer	Continental Motors Corp.
Model No.	F162K–3974
Governor assembly:	
Manufacturer	Novi Equipment Co., Inc.
Part No.	56640–A
Oil filter (compressor):	
Manufacturer	Cuno Engineering Corp.
Type	G

(4) *Capacities.*

Crankcase with filter	4½ qt (quarts)
Crankcase without filter	4 qt
Cooling system	4 gal (gallons)
Fuel tank	24 gal
Air cleaner (serial Nos. 125CR22346 through 125CR22545).	3½ pt (pints)
Air cleaner (serial Nos. 125CR24901 through 125CR25400).	7 pt
Oil capacity, compressor system	5 gal

(5) *Adjustment data.*

Spark plug gap	0.030 in.
Valves, intake, clearance, minimum	0.014 in. (hot)
Valves, exhaust, clearance, minimum	0.014 in. (hot)
Magneto points clearance	0.010 in.

(6) *Nuts and bolt torque data.*

Manifold	25-30 ft-lb (foot-pounds)
Cylinder head	70-75 ft-lb

(7) *Wiring diagram.* The wiring diagram for the air compressor is illustrated on figure 3.

(8) *Shipping dimensions.* Shipping dimensions are illustrated on figure 1.

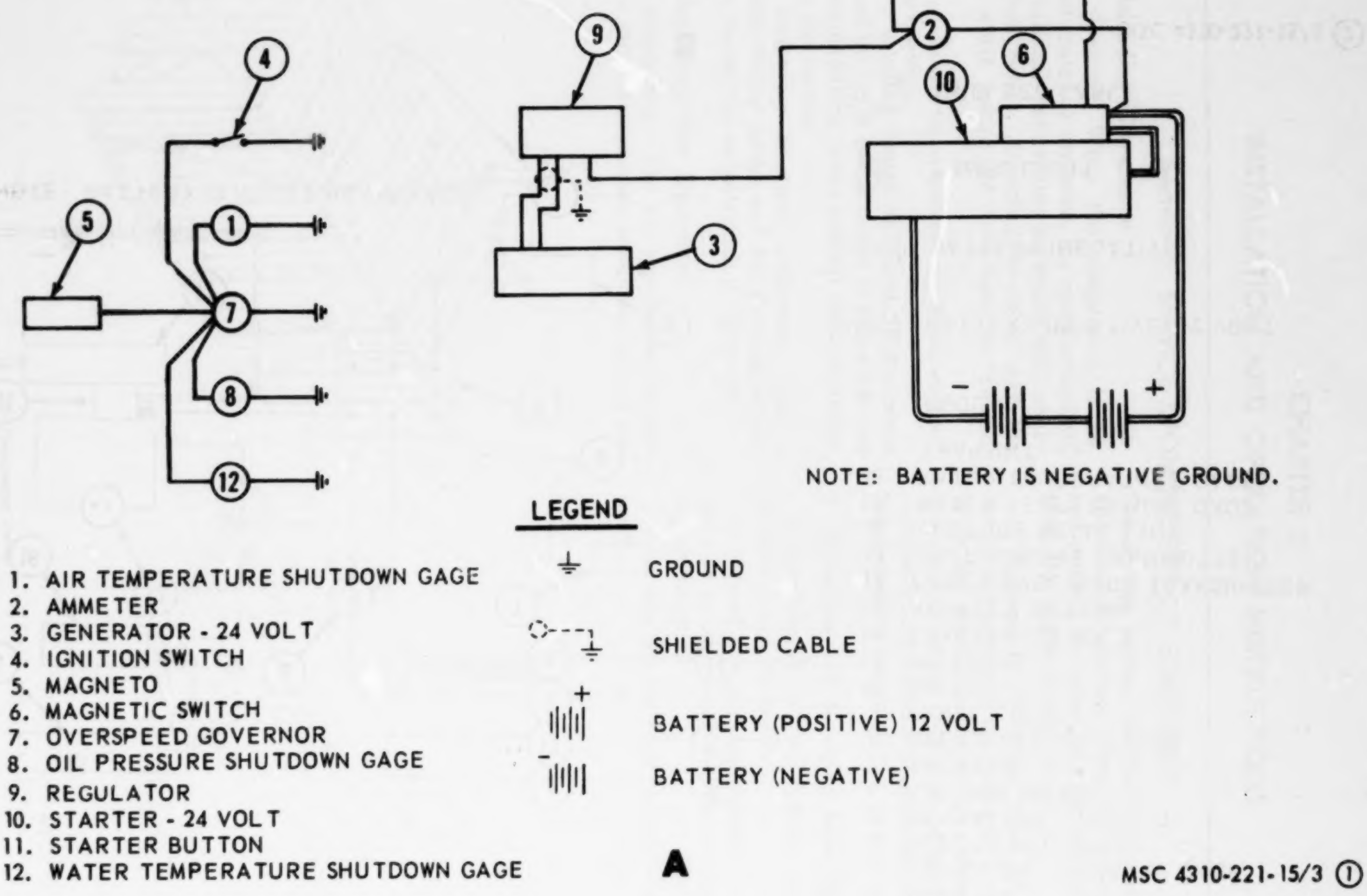
(9) *Performance data.*

(*a*) Pumping capacity — 125 max (maximum) cfm

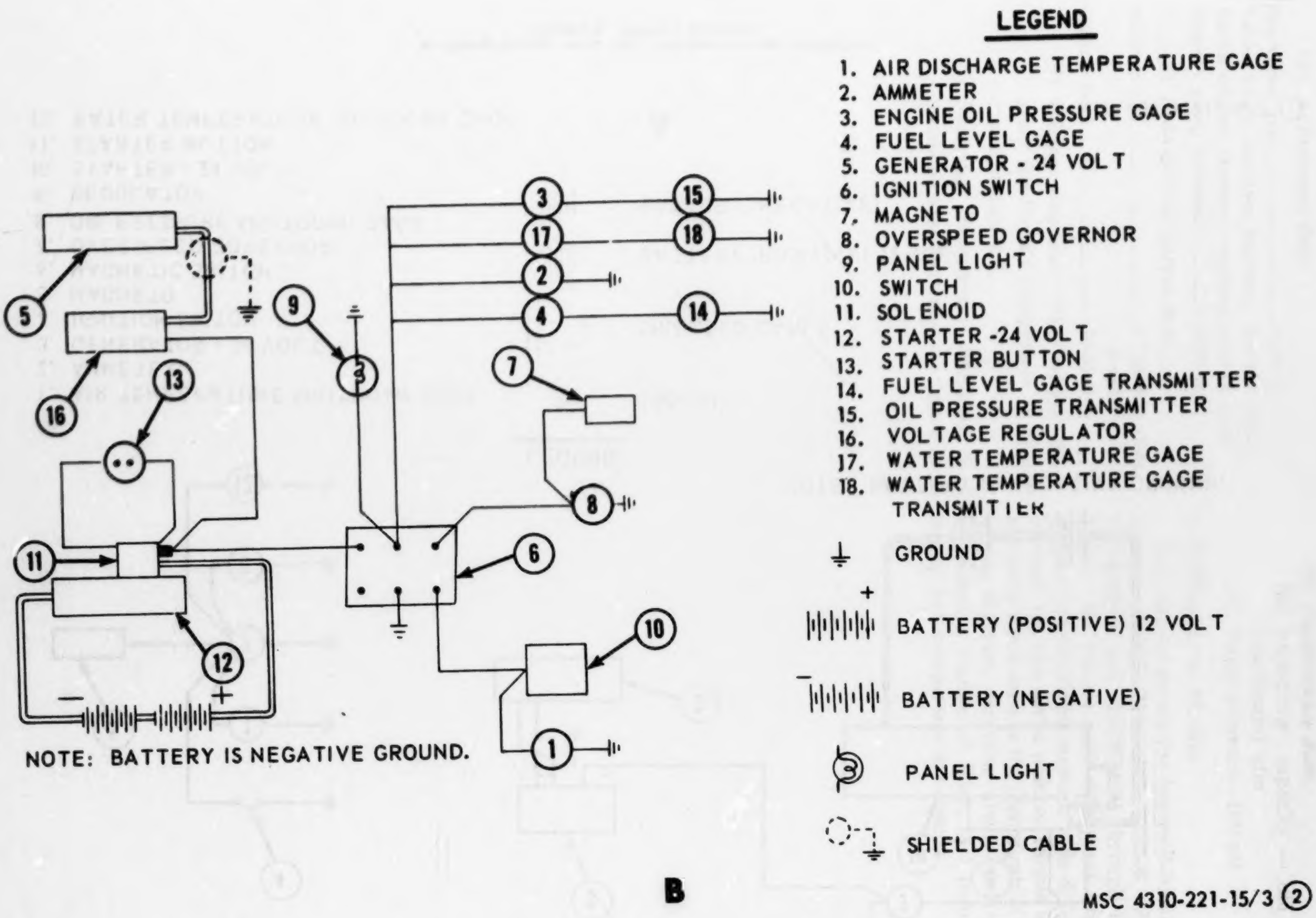
(*b*) Pump pressure—100 psi

5. Difference in Models

This manual covers the Ingersoll-Rand Compressor, serial Nos. 125CR22346 through 125CR22545 and 125CR24901 through 125CR-25400. No known unit differences exist for models covered in this manual. The differences between the two serial number ranges are the accessory items such as the identification plates, wiring diagram, servicing areas, controls and instruments, engine oil filter, fuel pump, and engine and compressor air cleaner.


4
9
11
2
6
10
5
1
7
3
8
12
–
+
NOTE: BATTERY IS NEGATIVE GROUND.
LEGEND
GROUND
SHIELDED CABLE
BATTERY (POSITIVE) 12 VOLT
BATTERY (NEGATIVE)
1. AIR TEMPERATURE SHUTDOWN GAGE
2. AMMETER
3. GENERATOR - 24 VOLT
4. IGNITION SWITCH
5. MAGNETO
6. MAGNETIC SWITCH
7. OVERSPEED GOVERNOR
8. OIL PRESSURE SHUTDOWN GAGE
9. REGULATOR
10. STARTER - 24 VOLT
11. STARTER BUTTON
12. WATER TEMPERATURE SHUTDOWN GAGE
A
MSC 4310-221-15/3 ①

A—Wiring diagram (serial Nos. 125CR22346 through 125CR22545)
Figure 3. Wiring diagram.


LEGEND
1. AIR DISCHARGE TEMPERATURE GAGE
2. AMMETER
3. ENGINE OIL PRESSURE GAGE
4. FUEL LEVEL GAGE
5. GENERATOR - 24 VOLT
6. IGNITION SWITCH
7. MAGNETO
8. OVERSPEED GOVERNOR
9. PANEL LIGHT
10. SWITCH
11. SOLENOID
12. STARTER -24 VOLT
13. STARTER BUTTON
14. FUEL LEVEL GAGE TRANSMITTER
15. OIL PRESSURE TRANSMITTER
16. VOLTAGE REGULATOR
17. WATER TEMPERATURE GAGE
18. WATER TEMPERATURE GAGE TRANSMITTER
GROUND
+
BATTERY (POSITIVE) 12 VOLT
−
BATTERY (NEGATIVE)
PANEL LIGHT
SHIELDED CABLE
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
−
+
NOTE: BATTERY IS NEGATIVE GROUND.
B
MSC 4310-221-15/3 ②

B—Wiring diagram (serial Nos. 125CR24901 through 125CR25400)
Figure 3—Continued.

CHAPTER 2

INSTALLATION AND OPERATION INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. Unloading Compressor

a. General. When the compressor is received crated or uncrated, the operator and organizational maintenance personnel will remove tiedown cables, strapping, blocking, and the like, which secure the compressor to the carrier.

Note. Be sure the compressor has sufficient clearance before unloading.

b. Unloading Crated-Shipment. Place cables around the crate as instructed in figure 4A. Use a suitable lifting device and lift the compressor from the carrier.

c. Unloading Uncrated Shipment. Use a suitable lifting device and lift the compressor from the carrier as instructed in figure 4B.

7. Unpacking New Equipment

a. Unpacking. The air compressor is normally shipped completely assembled, except for the service valves, minimum pressure valve, and fire extinguisher. Open the left-side cover and remove the separately packed components from the engine compartment.

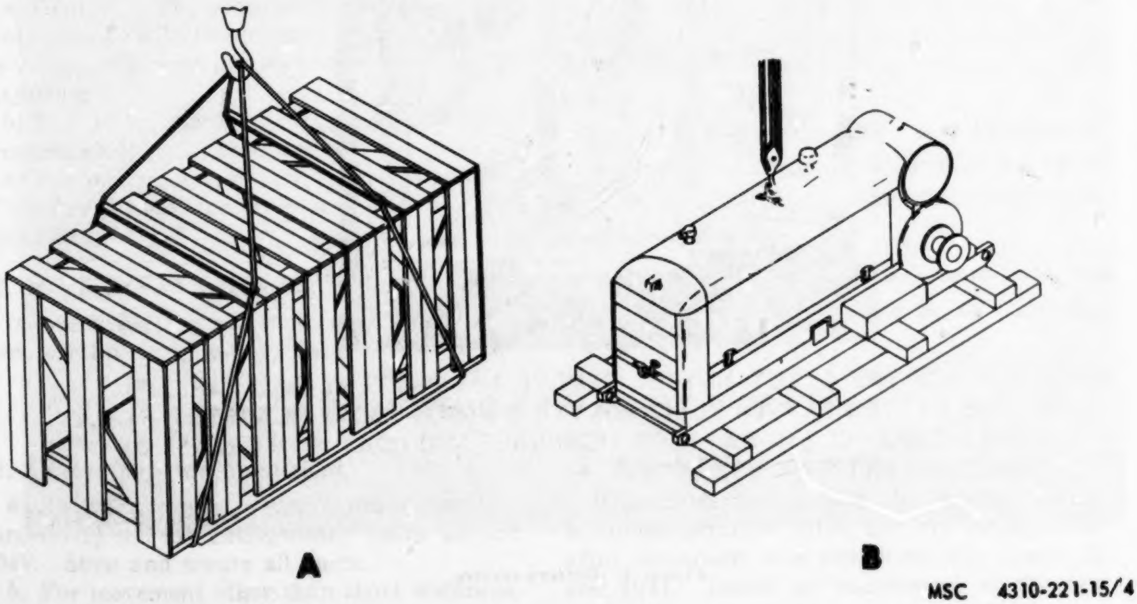
b. Removal of Protective Material and Devices. Prior to placing equipment in operation or to the extent necessary for inspection, depreservation of the item shall be performed as outlined on DA Form 2258, attached on or near the operator's controls.

8. Inspecting and Servicing New Equipment

a. Performing the preventive maintenance services (pars. 32 and 33).

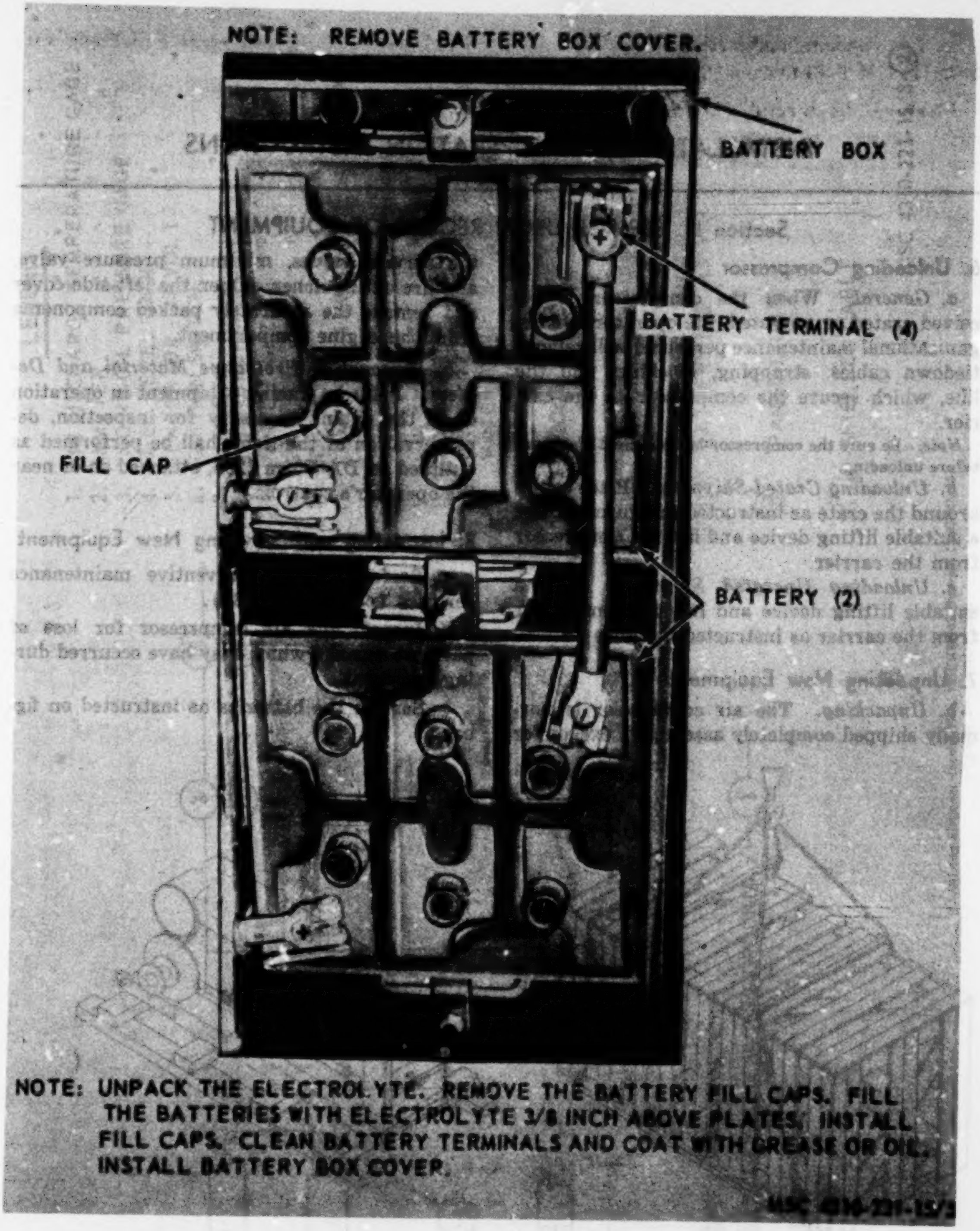
b. Inspect the air compressor for loss of parts or damage which may have occurred during shipment.

c. Service the batteries as instructed on figure 5.



A—Compressor, crated
B—Compressor, uncrated

Figure 4. Unloading compressor.



NOTE: REMOVE BATTERY BOX COVER.

BATTERY BOX
BATTERY TERMINAL (4)
FILL CAP
BATTERY (2)

NOTE: UNPACK THE ELECTROLYTE. REMOVE THE BATTERY FILL CAPS. FILL THE BATTERIES WITH ELECTROLYTE 3/8 INCH ABOVE PLATES. INSTALL FILL CAPS. CLEAN BATTERY TERMINALS AND COAT WITH GREASE OR OIL. INSTALL BATTERY BOX COVER.

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Figure 5. Battery service.

d. For servicing and testing of wet batteries, refer to TM 9-6140-200-15.

Warning: Be careful when handling electrolyte. It contains sulphuric acid which causes severe burns to skin or eyes. If solution comes in contact with the body, wash with fresh water immediately.

e. Fill the cooling system with proper coolant to protect the cooling system adequately to the lowest temperature expected. Refer to table 1 for correct antifreeze solution percentage.

Table 1. Freezing Points, Composition, and Specific Gravities of Military Antifreeze Materials

Lowest expected ambient temp 0° F.	Pints of inhibited glycol per gal of coolant [1]	Compound, antifreeze, Arctic [2]	Ethylene glycol coolant solution specific gravity at 68° F.[3]
+20	1½	Issued full strength and ready mixed for 0° to −65° F. temperatures for both initial installation and replenishment of losses.	1.022
+10	2		1.036
0	2¾		1.047
−10	3¼		1.055
−20	3½		1.062
−30	4		1.067
−40	4¼		1.073
−50	Arctic antifreeze preferred.	DO NOT DILUTE WITH WATER OR ANY OTHER SUBSTANCE.	
−60			
−75			

[1] Maximum protection is obtained at 60 percent by volume (4.8 pt. of ethylene glycol per gal. of solution).

[2] Military Specification MIL-C 11755 Arctic type, nonvolatile antifreeze compound is intended for use in the cooling system of liquid-cooled internal combustion engines. It is used for protection against freezing primarily in Arctic regions where the ambient temperature remains for extended periods of time close to —40° F. or below, to as low as —90 ° F.

[3] Use an accurate hydrometer. To test hydrometer, use 1 part ethylene glycol antifreeze to 2 parts water. This should produce a hydrometer reading of 0° F.

Note. Fasten a tag near the radiator filler cap indicating the type of antifreeze.

9. Installation of Separately Packed Components

a. General. The separately packed components shipped with the compressor are the service valves, minimum pressure valve, and fire extinguisher.

b. For instructions covering the minimum pressure valve, refer to figure 59.

c. For instructions covering the installation of the fire extinguisher cylinder, refer to paragraph 25.

10. Installation or Settingup Instructions

In preparing the air compressor for operation, select a clean, level location as near to the area of operation as possible. If the unit is located in an inclosed area, provide adequate ventilation.

Note. Since the compressor requires large quantities of air, it is important to provide a location as dust-free as possible.

Warning: If the compressor is to be installed in a closed area, exhaust gases must be piped outside. Continued breathing of exhaust fumes is dangerous.

Caution: The compressor may be operated up to 15° out-of-level lengthwise or sidewise. Check all oil frequently.

Section II. MOVEMENT TO A NEW WORK SITE

11. Dismantling for Movement

a. Remove the service valves, minimum pressure valve, and fire extinguisher (pars. 25 and 104). Stow and secure all parts.

b. For movement other than short distances, prepare the air compressor as outlined in paragraph 112, and secure to carrier.

12. Reinstallation After Movement

Reassemble and install the service valves, minimum pressure valve, and fire extinguisher after movement to a new work site (pars. 25 and 104). Install air compressor at the new work site as instructed in paragraph 10.

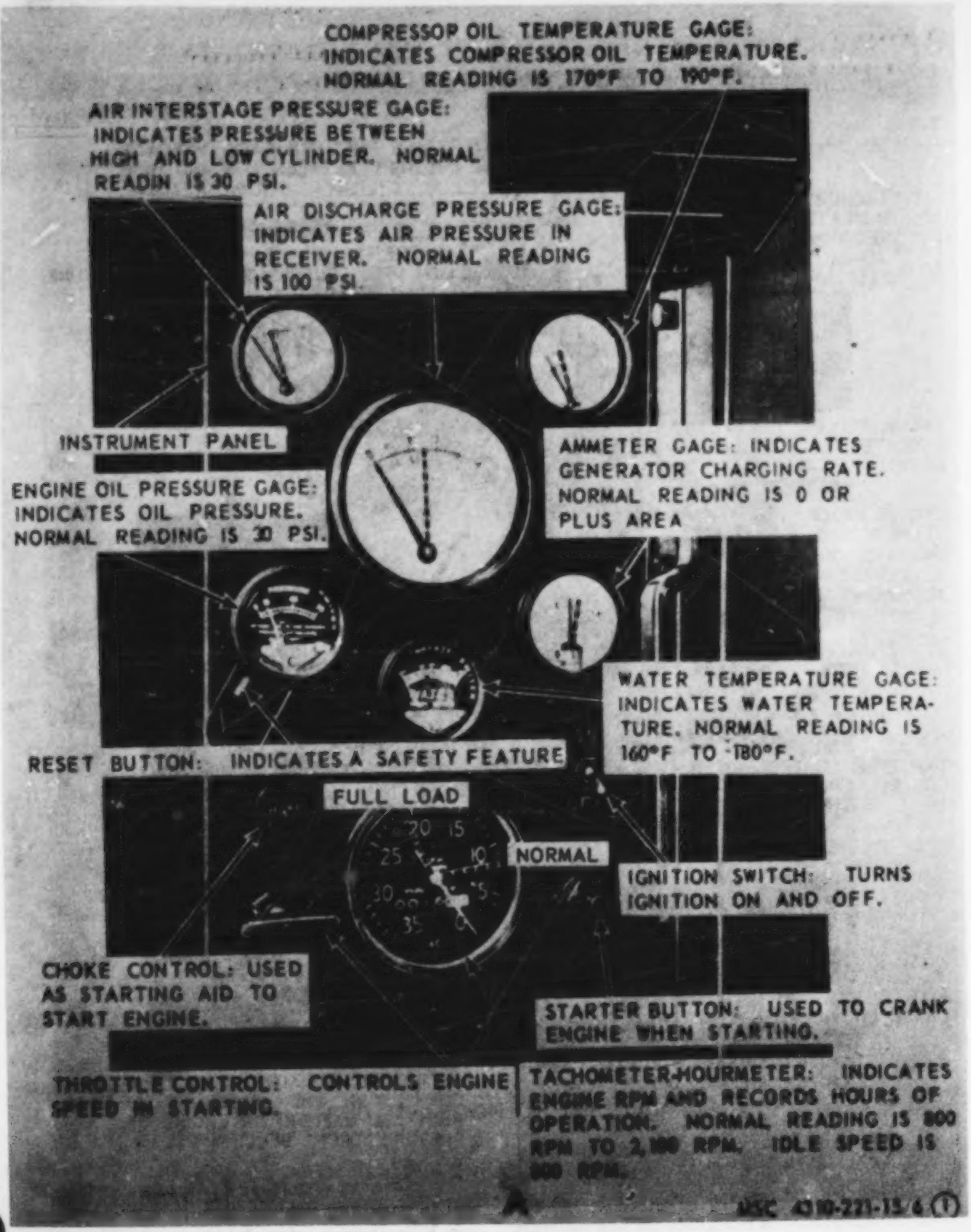
Section III. CONTROLS AND INSTRUMENTS

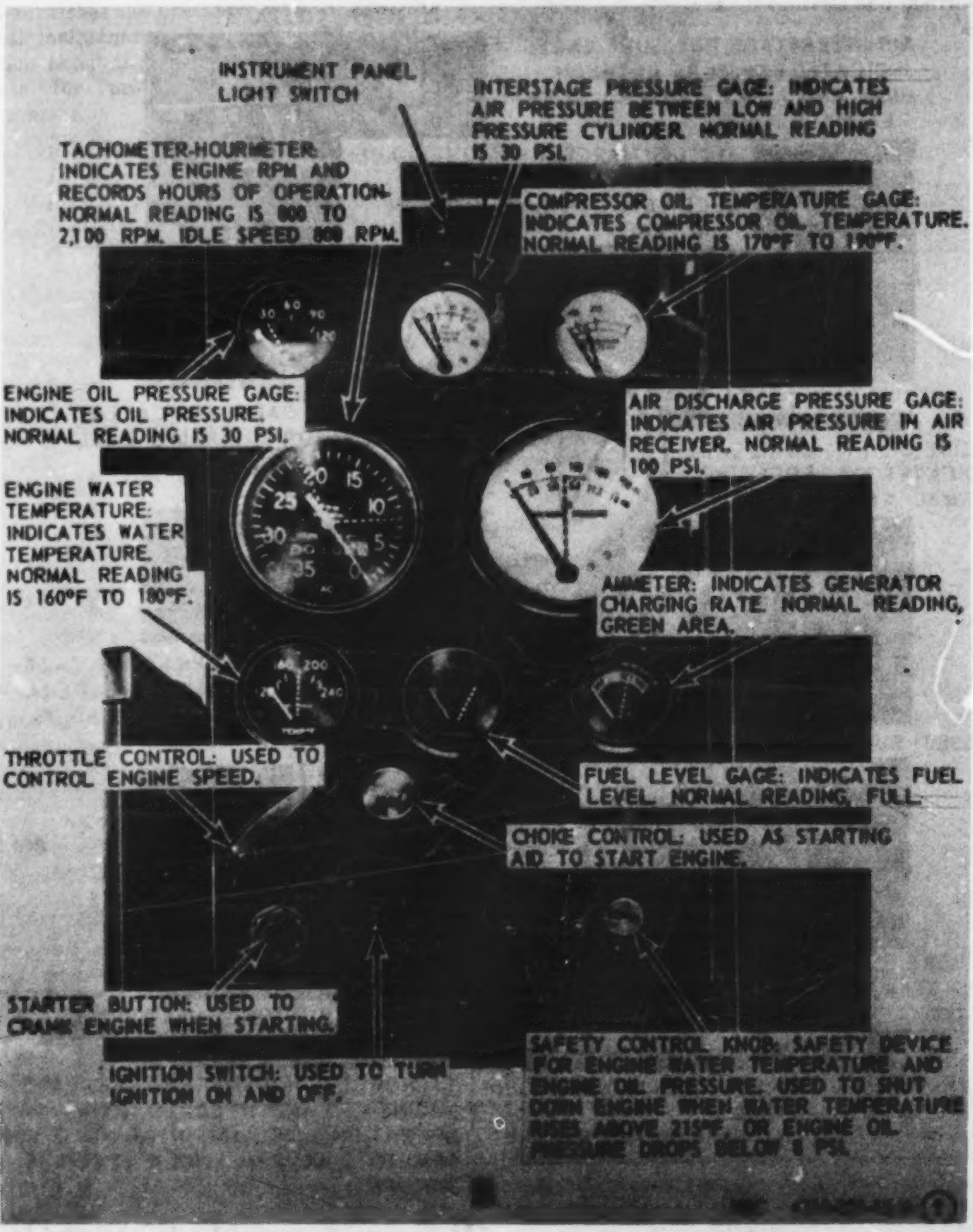
13. General

This section describes, locates, illustrates, and furnishes the operator, crew, or organizational maintenance personnel sufficient information about the various controls and instruments for proper operation of the air compressor.

14. Controls and Instruments

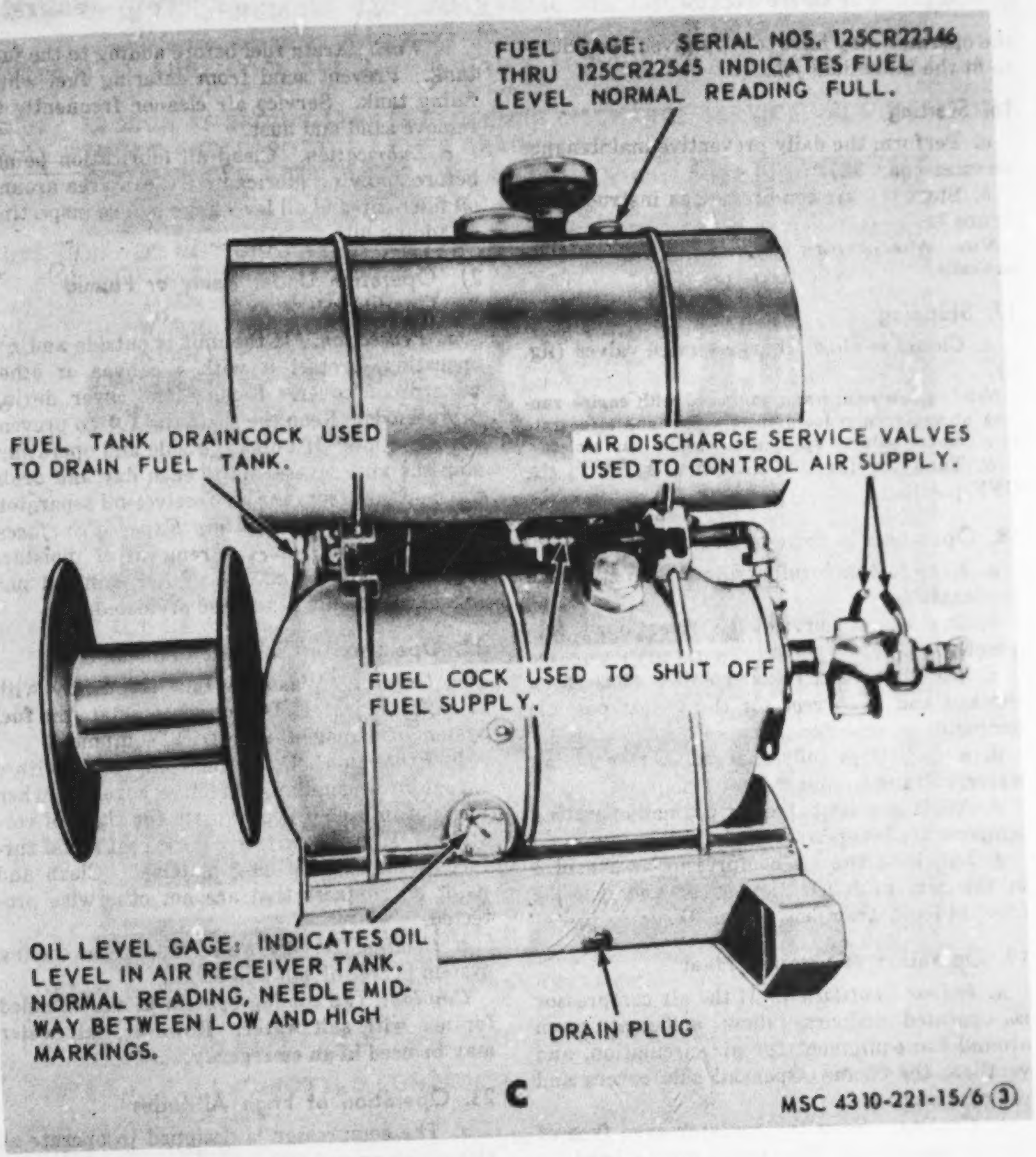
Refer to figure 6 for the position, purpose, and normal readings of all controls and instruments.


COMPRESSOP OIL TEMPERATURE GAGE: INDICATES COMPRESSOR OIL TEMPERATURE. NORMAL READING IS 170°F TO 190°F.
AIR INTERSTAGE PRESSURE GAGE: INDICATES PRESSURE BETWEEN HIGH AND LOW CYLINDER. NORMAL READIN IS 30 PSI.
AIR DISCHARGE PRESSURE GAGE: INDICATES AIR PRESSURE IN RECEIVER. NORMAL READING IS 100 PSI.
INSTRUMENT PANEL
AMMETER GAGE: INDICATES GENERATOR CHARGING RATE. NORMAL READING IS 0 OR PLUS AREA
ENGINE OIL PRESSURE GAGE: INDICATES OIL PRESSURE. NORMAL READING IS 30 PSI.
WATER TEMPERATURE GAGE: INDICATES WATER TEMPERATURE. NORMAL READING IS 160°F TO 180°F.
RESET BUTTON: INDICATES A SAFETY FEATURE
FULL LOAD
NORMAL
20
15
25
10
30
5
35
0
IGNITION SWITCH: TURNS IGNITION ON AND OFF.
CHOKE CONTROL: USED AS STARTING AID TO START ENGINE.
STARTER BUTTON: USED TO CRANK ENGINE WHEN STARTING.
THROTTLE CONTROL: CONTROLS ENGINE SPEED IN STARTING.
TACHOMETER-HOURMETER: INDICATES ENGINE RPM AND RECORDS HOURS OF OPERATION. NORMAL READING IS 800 RPM TO 2,100 RPM. IDLE SPEED IS 800 RPM.
MSC 4310-221-15/6 ①


INSTRUMENT PANEL LIGHT SWITCH
INTERSTAGE PRESSURE GAGE: INDICATES AIR PRESSURE BETWEEN LOW AND HIGH PRESSURE CYLINDER. NORMAL READING IS 30 PSI.
TACHOMETER-HOURMETER: INDICATES ENGINE RPM AND RECORDS HOURS OF OPERATION. NORMAL READING IS 800 TO 2,100 RPM. IDLE SPEED 800 RPM.
COMPRESSOR OIL TEMPERATURE GAGE: INDICATES COMPRESSOR OIL TEMPERATURE. NORMAL READING IS 170°F TO 190°F.
ENGINE OIL PRESSURE GAGE: INDICATES OIL PRESSURE. NORMAL READING IS 30 PSI.
AIR DISCHARGE PRESSURE GAGE: INDICATES AIR PRESSURE IN AIR RECEIVER. NORMAL READING IS 100 PSI.
ENGINE WATER TEMPERATURE: INDICATES WATER TEMPERATURE. NORMAL READING IS 160°F TO 180°F.
AMMETER: INDICATES GENERATOR CHARGING RATE. NORMAL READING, GREEN AREA.
THROTTLE CONTROL: USED TO CONTROL ENGINE SPEED.
FUEL LEVEL GAGE: INDICATES FUEL LEVEL. NORMAL READING, FULL.
CHOKE CONTROL: USED AS STARTING AID TO START ENGINE.
STARTER BUTTON: USED TO CRANK ENGINE WHEN STARTING.
IGNITION SWITCH: USED TO TURN IGNITION ON AND OFF.
SAFETY CONTROL KNOB: SAFETY DEVICE FOR ENGINE WATER TEMPERATURE AND ENGINE OIL PRESSURE. USED TO SHUT DOWN ENGINE WHEN WATER TEMPERATURE RISES ABOVE 215°F, OR ENGINE OIL PRESSURE DROPS BELOW 8 PSI.

B—Instrument panel and controls (serial Nos. 125CR24901 through 125CR25400)

Figure 6—Continued.


FUEL GAGE: SERIAL NOS. 125CR22346 THRU 125CR22545 INDICATES FUEL LEVEL NORMAL READING FULL.
FUEL TANK DRAINCOCK USED TO DRAIN FUEL TANK.
AIR DISCHARGE SERVICE VALVES USED TO CONTROL AIR SUPPLY.
FUEL COCK USED TO SHUT OFF FUEL SUPPLY.
OIL LEVEL GAGE: INDICATES OIL LEVEL IN AIR RECEIVER TANK. NORMAL READING, NEEDLE MIDWAY BETWEEN LOW AND HIGH MARKINGS.
DRAIN PLUG
C
MSC 4310-221-15/6 ③

C—Air receiver, oil separator, and oil level gage
Figure 6—Continued.

Section IV. OPERATION OF THE EQUIPMENT

15. General

a. The instructions in this section are published for the information and guidance of the personnel responsible for the operation of the air compressor.

b. The operator must know how to perform every operation of which the air compressor is capable. This section gives instructions on starting and stopping the air compressor. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

16. Starting

a. Perform the daily preventive maintenance services (par. 32).

b. Start the air compressor as instructed on figure 7.

Note. After starting compressor, it operates automatically.

17. Stopping

a. Close the air discharge service valves (fig. 6).

Note. Allow compressor to unload with engine running at minimum reduced speed. Continue to operate at minimum reduced speed until engine has cooled.

b. Turn the ignition switch (fig. 7) to the OFF position.

18. Operation in Extreme Cold (Below 0° F.)

a. Keep fuel tank full at all times to minimize condensation.

b. Drain and service the filter bowl frequently.

c. See that antifreeze solution has been checked and is correct for the lowest possible temperature expected.

d. Keep battery fully charged. After adding water, run the engine at least 1 hour.

e. Allow engine to reach normal operating temperature before applying a load.

f. Lubricate the air compressor as specified in the current lubrication order and detailed lubrication instructions (par. 30).

19. Operation in Extreme Heat

a. Indoor Ventilation. If the air compressor is operated indoors, allow sufficient room around the equipment for air circulation, and ventilate the room. Open all side covers and radiator shutters.

b. Cooling. Keep the radiator core free of foreign matter and filled to the proper level.

c. Air Compressor. During operation check all instruments frequently to make sure the compressor is not overloaded.

d. Lubrication. Lubricate the air compressor as specified in the current lubrication order.

20. Operation in Dusty or Sandy Areas

a. Protection. Shield the air compressor from dust. Take advantage of natural barriers which offer protection from dust and sand.

b. Fuel. Strain fuel before adding to the fuel tank. Prevent sand from entering fuel while filling tank. Service air cleaner frequently to remove sand and dust.

c. Lubrication. Clean all lubrication points before applying lubricants. Clean area around oil filler cap and oil level gage before inspecting or adding oil.

21. Operation Under Rainy or Humid Conditions

a. Protection. If the unit is outside and not operating, protect it with a canvas or other waterproof cover. Remove the cover during dry periods. Keep the fuel tank full to prevent condensation. If unit is outside and operating, stop the unit several times each day and drain the moisture from the air receiver-oil separator.

b. Cleaning and Painting Exposed Surfaces. Give special care to the removal of moisture from all components. Clean and paint all surfaces that are not otherwise protected.

22. Operation in Saltwater Areas

a. General. Wash the unit frequently with clean, fresh water. Do not contaminate the fuel system or damage the electrical equipment.

b. Protection. Cover the compressor with a tarpaulin or similar protective covering when it is not in use. Check closely for signs of corrosion. If metal parts are bare, coat metal surfaces with rust-proofing material. Clean and paint all surfaces that are not otherwise protected.

c. Cooling. Be sure water used in the cooling system is free of salt and alkali.

Caution: **The cooling system is not intended for use with salt water. However, salt water may be used in an emergency.**

23. Operation at High Altitudes

a. The compressor is designed to operate at elevations up to 5,000 feet above sea level without special service or adjustments.

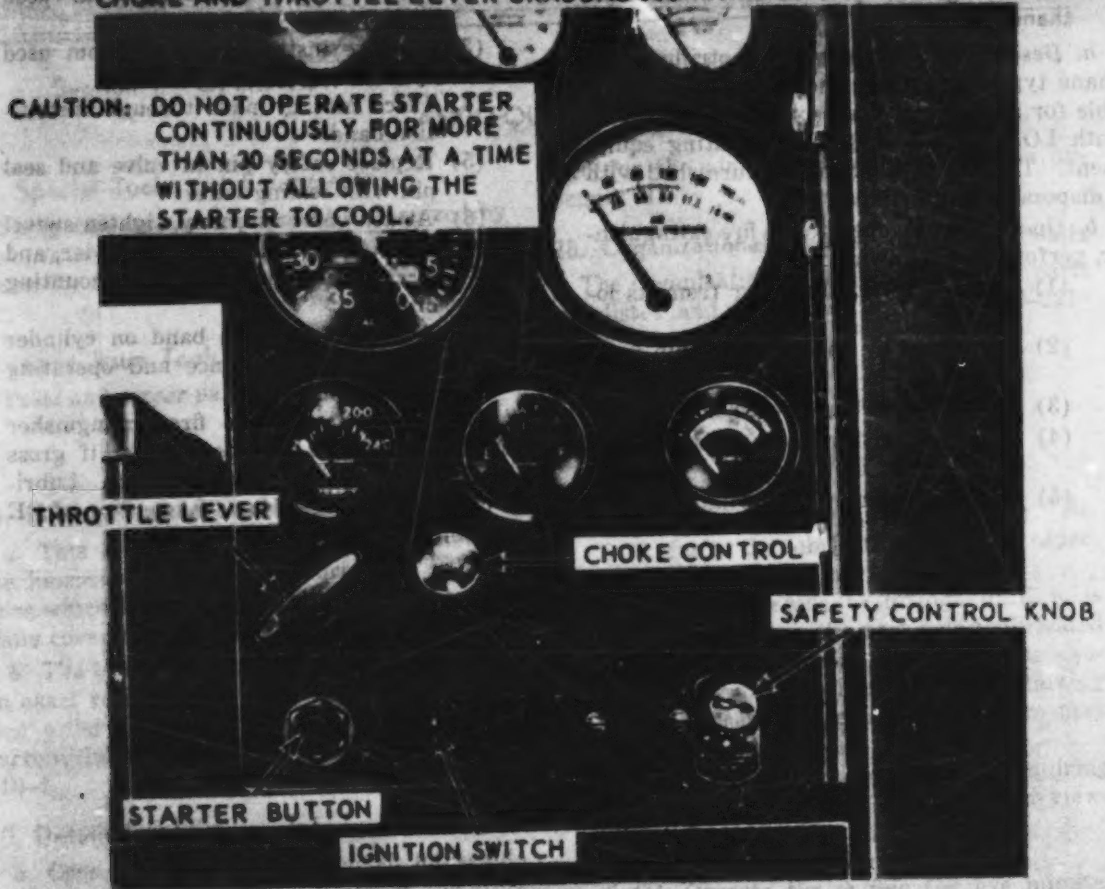
b. Above 5,000 feet, the compressor output may be reduced as much as 20 percent. This is a normal condition which cannot be prevented, but maximum performance can be maintained by carefully following the preventive maintenance services (pars. 32 and 33).

c. Be sure air cleaner is clean and free of material which could restrict the flow of intake air to the engine and compressor.

NOTE: RESET OIL PRESSURE GAGE FOR SERIAL NO. 125CR22346 THRU 125CR22345.

NOTE: OPEN FUEL COCK AND AIR DISCHARGE SERVICE VALVES (FIG.6C).

NOTE: AS SOON AS ENGINE STARTS CLOSE AIR DISCHARGE SERVICE VALVES. CLOSE CHOKE AND THROTTLE LEVER GRADUALLY.


THROTTLE LEVER
CHOKE CONTROL
SAFETY CONTROL KNOB
STARTER BUTTON
IGNITION SWITCH

CAUTION: DO NOT OPERATE STARTER CONTINUOUSLY FOR MORE THAN 30 SECONDS AT A TIME WITHOUT ALLOWING THE STARTER TO COOL.

STEP 1. PULL CHOKE CONTROL 1/2 WAY OUT.

STEP 2. TURN SAFETY CONTROL KNOB TO 'ON' POSITION.

STEP 3. PULL THROTTLE CONTROL ALL THE WAY OUT AND TURN TO LOCK-IN POSITION.

STEP 4. TURN IGNITION SWITCH TO "ON" POSITION.

STEP 5. PUSH STARTER BUTTON IN.

NOTE: AFTER ENGINE HAS STARTED, BE SURE THE SAFETY CONTROL KNOB IS TURNED TO THE "RUN" POSITION.

MSC 4310-221-15/7

Figure 7. Starting the air compressor.

Section V. OPERATION OF AUXILIARY MATERIEL USED IN CONJUNCTION WITH THE AIR COMPRESSOR

24. General

The monobromotrifluoromethane type fire extinguisher is the only auxiliary materiel used in conjunction with the air compressor.

25. Fire Extinguisher (Monobromotrifluoromethane Type)

a. Description. The monobromotrifluoromethane type fire extinguisher is generally suitable for all types of fires, except fires involved with LOX (liquid oxygen) generating equipment. The fire extinguisher is furnished with a disposable type cylinder.

b. Operation. To operate the fire extinguisher, perform the following:

(1) Remove fire extinguisher from its location.

(2) Break seal by pulling safety pin from handle.

(3) Point horn at base of flame.

(4) Press trigger for discharge and direct stream at base of flame.

(5) Replace cylinder immediately after using.

c. Replacement of Cylinder. To replace cylinder, perform the following:

(1) Press lever to release pressure from used cylinder.

(2) Loosen swivel valve coupling nut and remove valve assembly from used cylinder.

(3) Remove instruction band from used cylinder.

(4) Place new cylinder through instruction band.

(5) Replace safety pin in valve and seal pin with sealing wire.

(6) Attach valve assembly, tighten swivel coupling nut on the new cylinder, and place fire extinguisher in mounting bracket.

(7) Adjust instruction band on cylinder to show maintenance and operating instructions.

d. Maintenance. Weigh fire extinguisher every 3 months and replace cylinder if gross weight has decreased 4 ounces or more. Lubricate cylinder neck threads with one drop of OE 30 oil before reassembly.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR AND ORGANIZATIONAL MAINTENANCE TOOLS AND EQUIPMENT

26. Special Tools and Equipment

No special tools or equipment is required by the operator or organizational maintenance personnel for the maintenance of this air compressor.

27. Basic Issue Tools and Equipment

Tools and repair parts issued with or authorized for the air compressor are listed in appendix III.

28. Organizational Maintenance Repair Parts

The organizational maintenance repair parts are listed and illustrated in TM 5-4310-221-20P.

Section II. LUBRICATION

29. General Lubrication Information

a. This section contains a reproduction of the lubrication order and lubrication instructions which are supplemental to, and not specifically covered in, the lubrication order.

b. The lubrication order shown in figure 8 is an exact reproduction of the approved lubrication order for the air compressor. For the current lubrication order, refer to DA Pam 310-4.

30. Detailed Lubrication Information

a. Care of Lubricants. Keep all lubricants (grease and oil) in closed containers and store in a clean, dry place away from external heat. Allow no dirt, dust, water, or other foreign material of any kind to mix with the lubricants.

b. Cleaning.

(1) Wipe grease fittings with a clean, dry cloth before lubricating. Remove old or hardened lubricants from fittings with an approved cleaning solvent.

(2) Keep areas around drains, filler caps, and plugs clean. Remove caps or plugs only when checking levels or adding lubricants.

(3) After lubrication wipe excess lubricant from fittings.

c. Lubrication.

(1) Lubricate in the proper quantity. Refer to the lubrication order for capacities.

(2) Apply grease to fittings until it is visible from the part being lubricated unless otherwise specified. Use caution when lubricating parts containing grease seals; excessive pressure may ruin seals.

d. Points of Lubrication. Points requiring lubrication are illustrated as referenced views on figure 8.

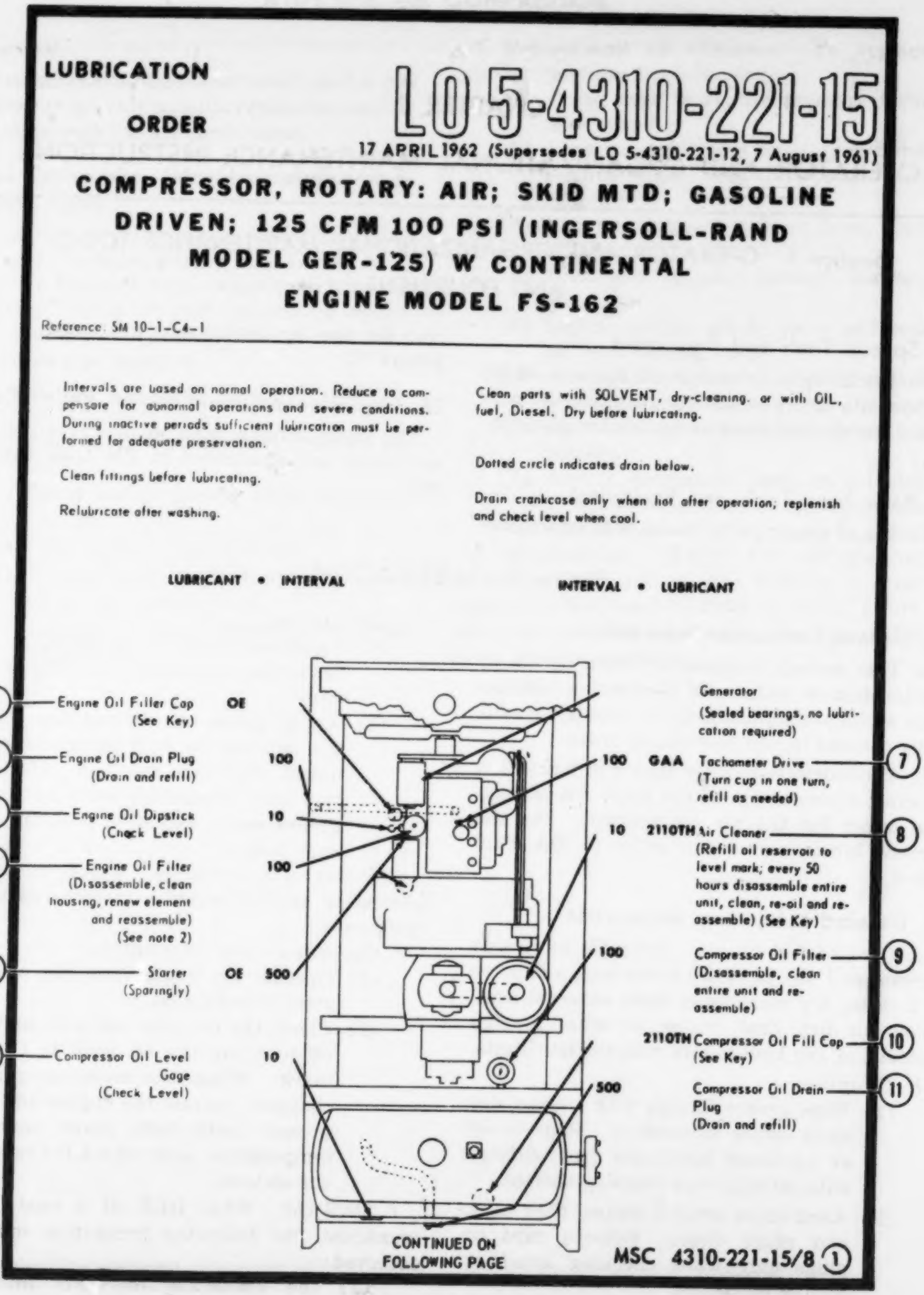
e. Operation After Lubrication.

(1) Operate the engine for five minutes after changing oil.

(2) Check the oil level and add sufficient oil to bring the oil level to the full mark. When the compressor oil is changed, operate the engine and compressor until both reach operating temperature, and recheck the compressor oil level.

f. OES Oil. When OES oil is used in the crankcase, the following precaution must be observed:

(1) The crankcase oil level must be checked frequently as oil consumption may increase.



LUBRICATION

ORDER

LO 5-4310-221-15

17 APRIL 1962 (Supersedes LO 5-4310-221-12, 7 August 1961)

COMPRESSOR, ROTARY: AIR; SKID MTD; GASOLINE DRIVEN; 125 CFM 100 PSI (INGERSOLL-RAND MODEL GER-125) W CONTINENTAL ENGINE MODEL FS-162

Reference: SM 10-1-C4-1

Intervals are based on normal operation. Reduce to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Relubricate after washing.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Dotted circle indicates drain below.

Drain crankcase only when hot after operation; replenish and check level when cool.

		LUBRICANT	INTERVAL
①	Engine Oil Filler Cap (See Key)	OE	
②	Engine Oil Drain Plug (Drain and refill)		100
③	Engine Oil Dipstick (Check Level)		10
④	Engine Oil Filter (Disassemble, clean housing, renew element and reassemble) (See note 2)		100
⑤	Starter (Sparingly)	OE	500
⑥	Compressor Oil Level Gage (Check Level)		10

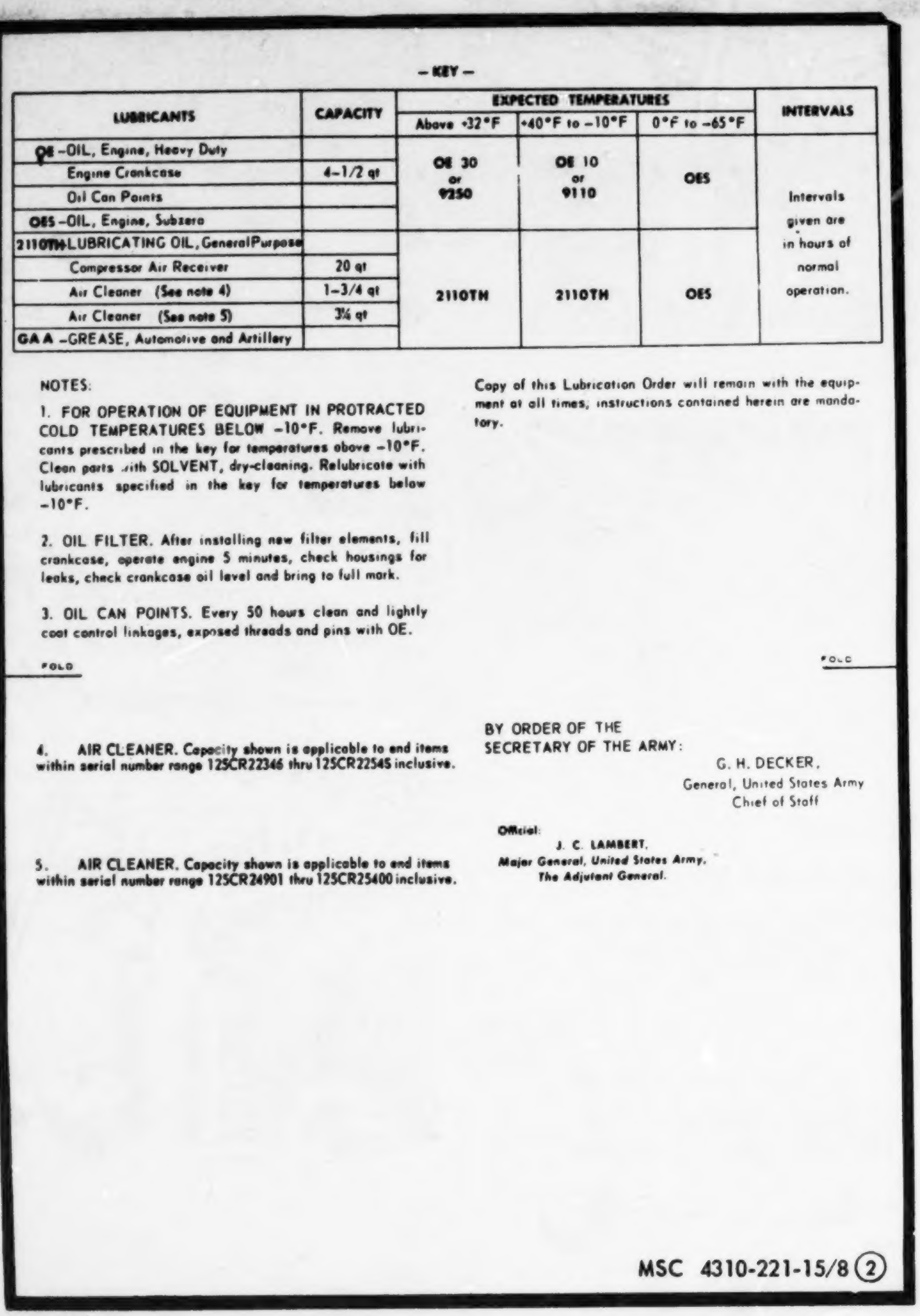
INTERVAL	LUBRICANT		
		Generator (Sealed bearings, no lubrication required)	
100	GAA	Tachometer Drive (Turn cup in one turn, refill as needed)	⑦
10	2110TH	Air Cleaner (Refill oil reservoir to level mark; every 50 hours disassemble entire unit, clean, re-oil and reassemble) (See Key)	⑧
100		Compressor Oil Filter (Disassemble, clean entire unit and reassemble)	⑨
	2110TH	Compressor Oil Fill Cap (See Key)	⑩
500		Compressor Oil Drain Plug (Drain and refill)	⑪

CONTINUED ON FOLLOWING PAGE

MSC 4310-221-15/8 ①

Front

Figure 8. Lubrication order.



— KEY —

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40°F to −10°F	0°F to −65°F	
OE −OIL, Engine, Heavy Duty		OE 30 or 9250	OE 10 or 9110	OES	Intervals given are in hours of normal operation.
Engine Crankcase	4−1/2 qt				
Oil Can Points					
OES −OIL, Engine, Subzero					
2110TH-LUBRICATING OIL, General Purpose		2110TH	2110TH	OES	
Compressor Air Receiver	20 qt				
Air Cleaner (See note 4)	1−3/4 qt				
Air Cleaner (See note 5)	3¼ qt				
GAA −GREASE, Automotive and Artillery					

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW −10°F. Remove lubricants prescribed in the key for temperatures above −10°F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricants specified in the key for temperatures below −10°F.

2. OIL FILTER. After installing new filter elements, fill crankcase, operate engine 5 minutes, check housings for leaks, check crankcase oil level and bring to full mark.

3. OIL CAN POINTS. Every 50 hours clean and lightly coat control linkages, exposed threads and pins with OE.

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

FOLD

FOLD

4. AIR CLEANER. Capacity shown is applicable to end items within serial number range 125CR22346 thru 125CR22545 inclusive.

5. AIR CLEANER. Capacity shown is applicable to end items within serial number range 125CR24901 thru 125CR25400 inclusive.

BY ORDER OF THE
SECRETARY OF THE ARMY:

G. H. DECKER,
General, United States Army
Chief of Staff

Official:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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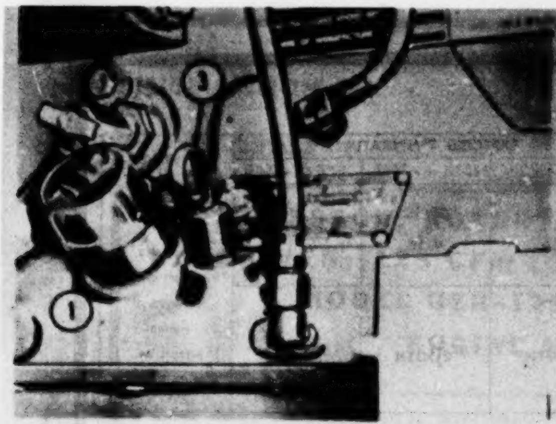
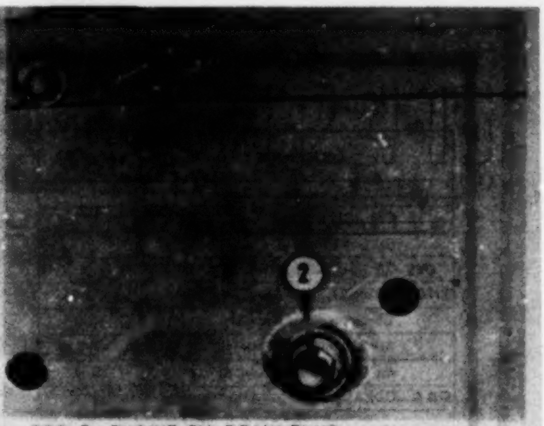
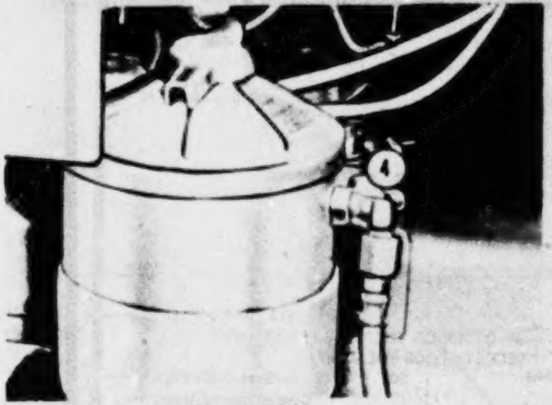
Back
Figure 8—Continued.



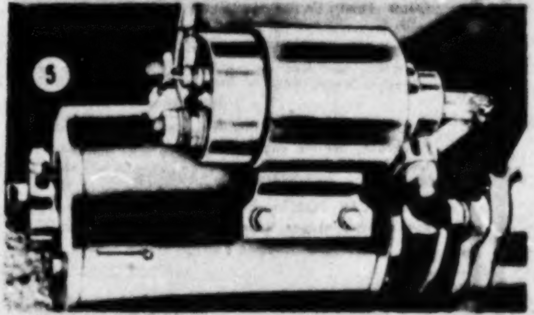
REF. 1 ENGINE OIL FILLER CAP
REF. 3 ENGINE OIL DIPSTICK



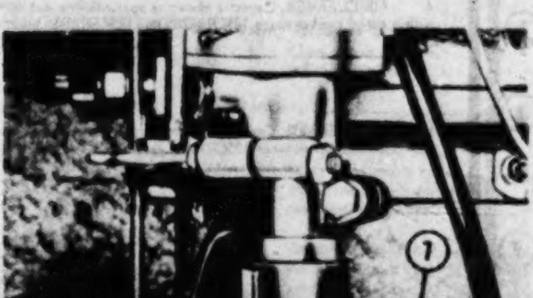
REF. 2 ENGINE OIL DRAIN PLUG



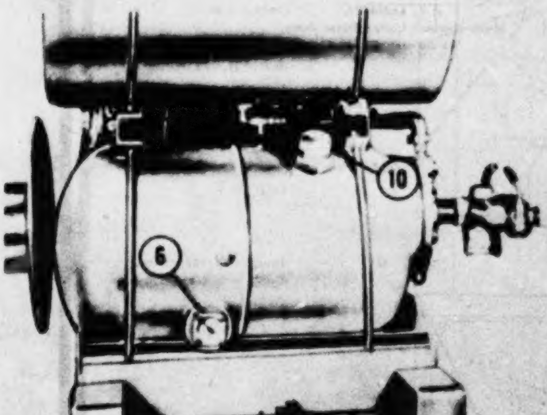
REF. 4 ENGINE OIL FILTER



REF. 5 STARTER



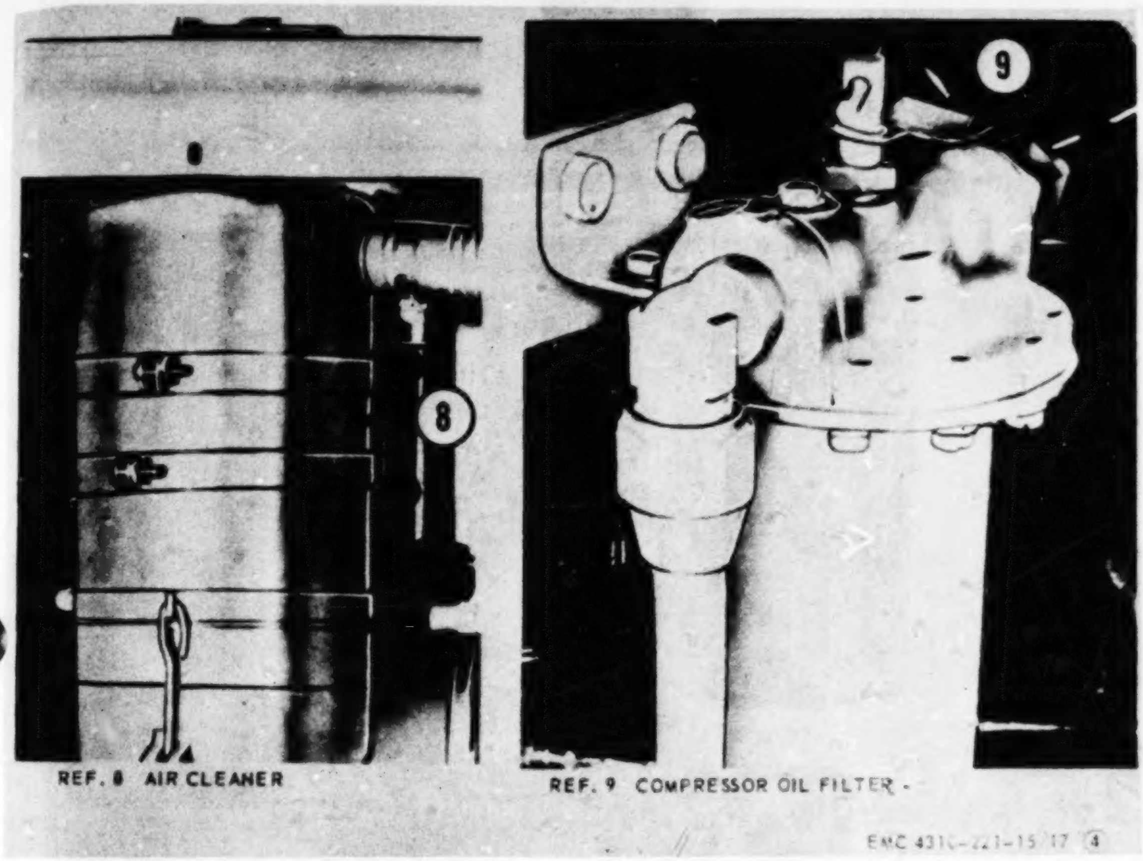
REF. 7 TACHOMETER DRIVE



REF. 6 COMPRESSOR OIL LEVEL GAGE
REF. 10 COMPRESSOR OIL FILL CAP
REF. 11 COMPRESSOR OIL DRAIN PLUG

EMC 4310-221-15/17 (3)

References 1 through 7, 10, and 11
Figure 8—Continued.



REF. 8 AIR CLEANER

REF. 9 COMPRESSOR OIL FILTER

References 8 and 9
Figure 8—Continued.

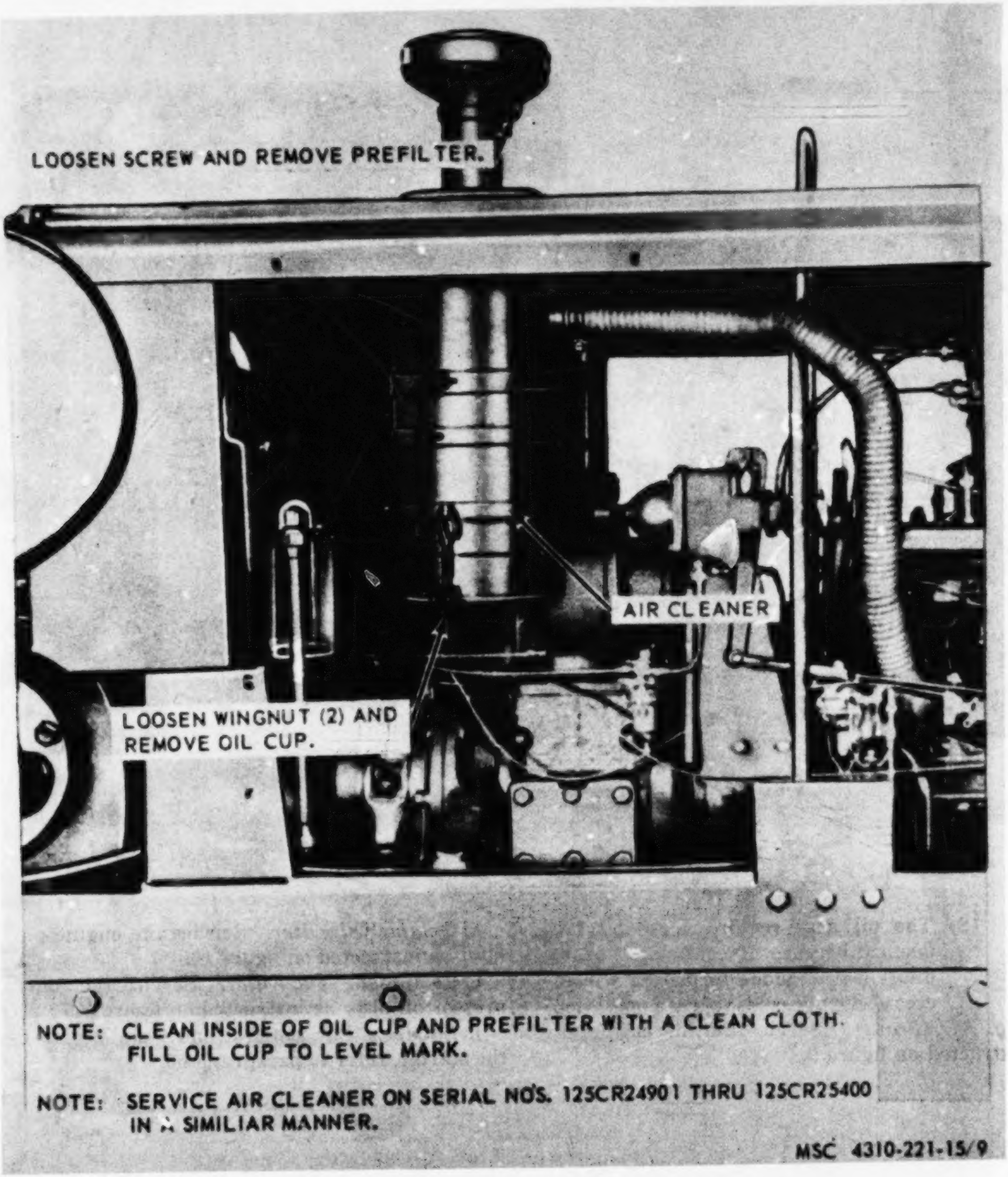
(2) The oil may require changing frequently because of contamination by dilution and sludge formation will increase during cold-weather operation.

g. Air Cleaner. Service the air cleaner as instructed on figure 9.

h. Engine Oil Filter. Service the engine oil filter as instructed on figure 10.

i. Compressor Oil Filter. Service the compressor oil filter as instructed on figure 11.

j. Starter. For removal and installation of the starter, refer to paragraph 66.


LOOSEN SCREW AND REMOVE PREFILTER.

AIR CLEANER

LOOSEN WINGNUT (2) AND REMOVE OIL CUP.

NOTE: CLEAN INSIDE OF OIL CUP AND PREFILTER WITH A CLEAN CLOTH. FILL OIL CUP TO LEVEL MARK.

NOTE: SERVICE AIR CLEANER ON SERIAL NO'S. 125CR24901 THRU 125CR25400 IN A SIMILIAR MANNER.

MSC 4310-221-15/9

Figure 9. Air cleaner service.

NOTE: FOR SERVICE, REMOVE COVER, GASKET, AND ELEMENT. CLEAN INSIDE OF HOUSING AND INSERT NEW ELEMENT. USE NEW GASKET AND INSTALL COVER. (SEE LO 5-4310-221-15, FIG. 8.)

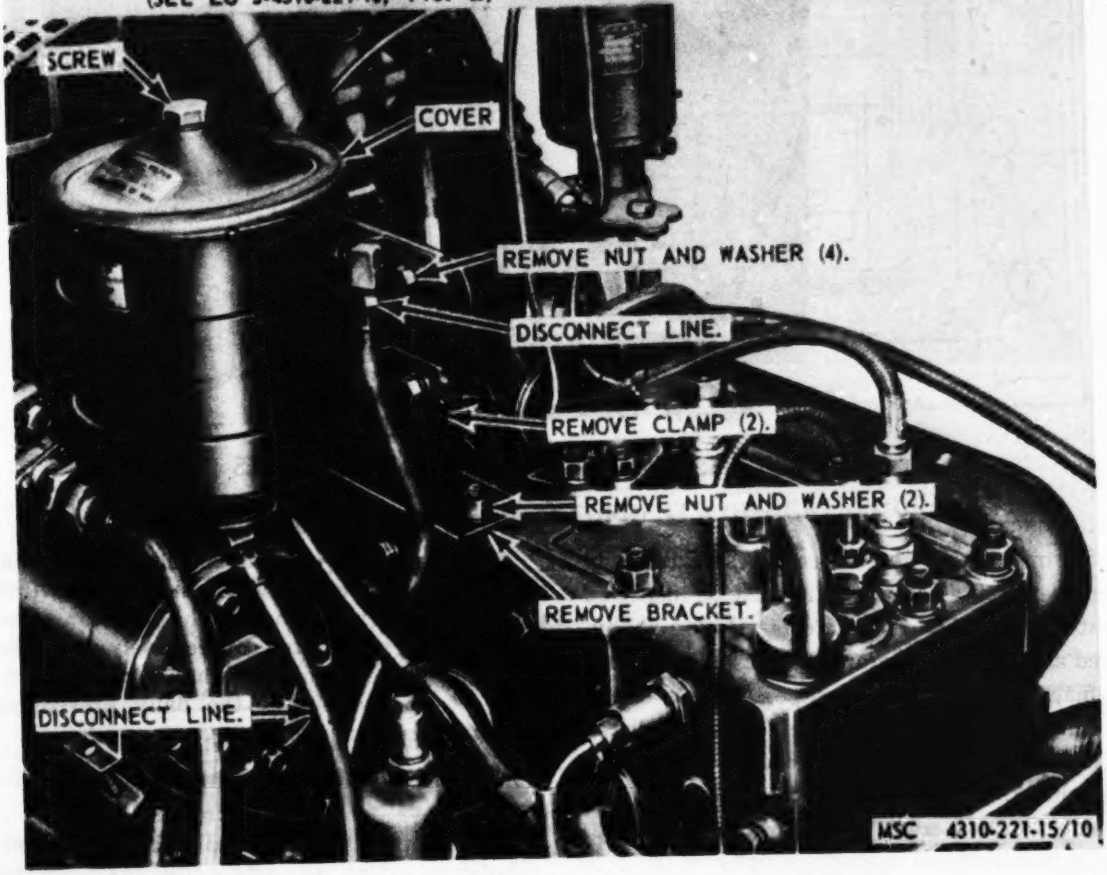

SCREW
COVER
REMOVE NUT AND WASHER (4).
DISCONNECT LINE.
REMOVE CLAMP (2).
REMOVE NUT AND WASHER (2).
REMOVE BRACKET.
DISCONNECT LINE.
MSC 4310-221-15/10

Figure 10. Engine oil filter service, removal and installation.

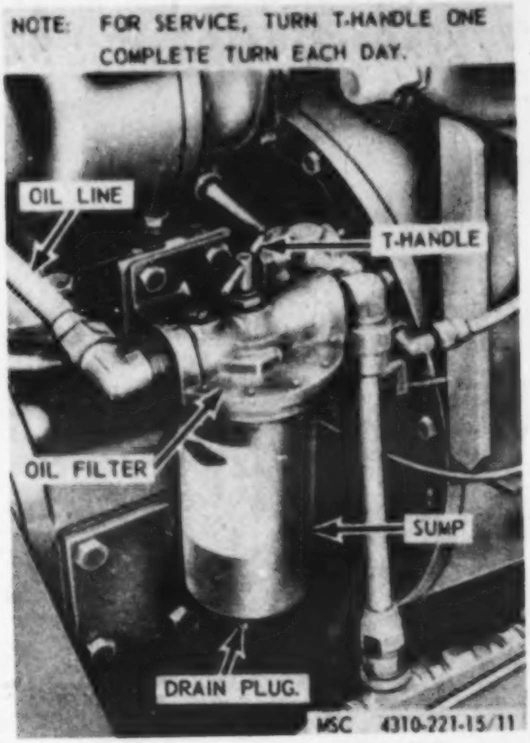

NOTE: FOR SERVICE, TURN T-HANDLE ONE COMPLETE TURN EACH DAY.
OIL LINE
T-HANDLE
OIL FILTER
SUMP
DRAIN PLUG.
MSC 4310-221-15/11

Figure 11. Compressor oil filter service.

Section III. PREVENTIVE MAINTENANCE SERVICES

31. General

To insure that the air compressor is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed consecutively and are described in paragraphs 32 and 33. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 at the earliest possible opportunity.

32. Daily Preventive Maintenance Services

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 12 for the daily preventive maintenance services.

33. Quarterly Preventive Maintenance Services

a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months or 250 hours of operation, whichever occurs first.

b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 13 for quarterly preventive maintenance services.

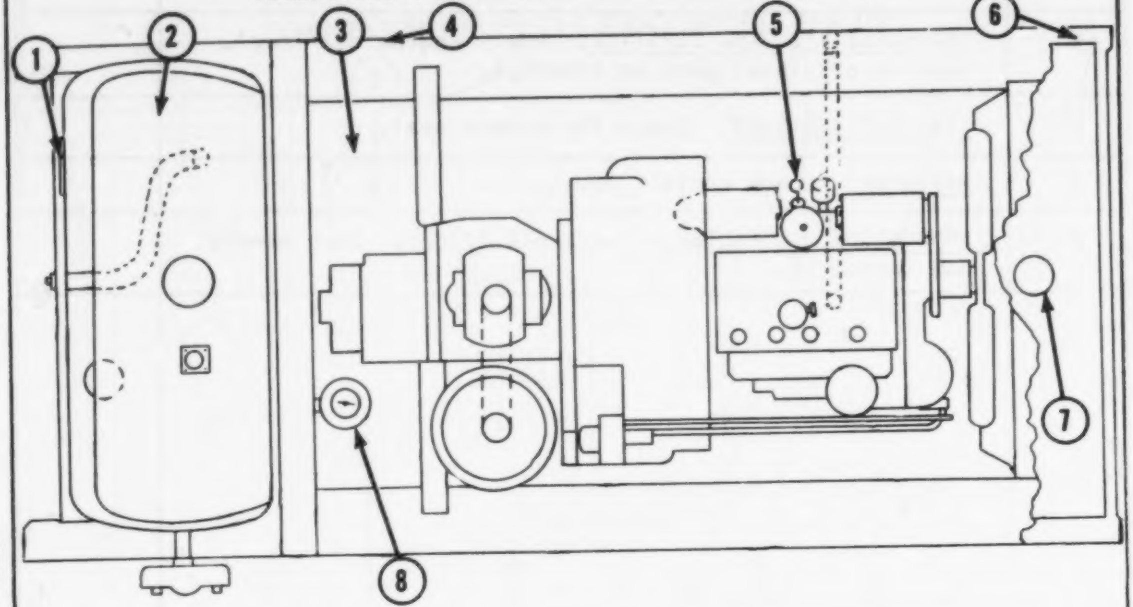
PREVENTIVE MAINTENANCE SERVICES

DAILY

TM 5-4310-221-15

COMPRESSOR

COMPRESSOR: INGERSOLL-RAND MODEL GER-125



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR. REF
1	**AIR RECEIVER AND OIL LEVEL GAGE.** Check air receiver oil level. The oil level gage needle will be midway between low and high markings.	
2	**FUEL TANK.** Check fuel level.	
3	**CONTROLS, INSTRUMENTS, GAGES, AND SWITCHES.** Check for proper operation. Normal readings for instruments and gages are: Ammeter - charge area, On serial numbers 125CR24901 through 125CR25400-green area; Engine oil pressure gage - 30 psi; Air interstage pressure gage - 30 psi; Compressor oil temperature gage - 170°F to 190°F; Air discharge pressure gage - 100 psi; Engine water temperature gage - 160°F to 180°F.	

Figure 12. Daily preventive maintenance services.

ITEM		PAR. REF
4	BATTERIES. Check electrolyte level. The electrolyte level must be 3/8 inch above plates. Check cables for hand tightness. Do not add water in freezing weather unless engine is to be operated immediately for one hour. (Weekly)	
5	CRANKCASE FILL AND DIPSTICK. Check engine oil level. Fill to oil level mark on dipstick.	
6	FIRE EXTINGUISHER. Check for broken seal.	
7	RADIATOR. Check coolant level.	
8	COMPRESSOR OIL FILTER. Check oil filter. Turn handle one turn.	

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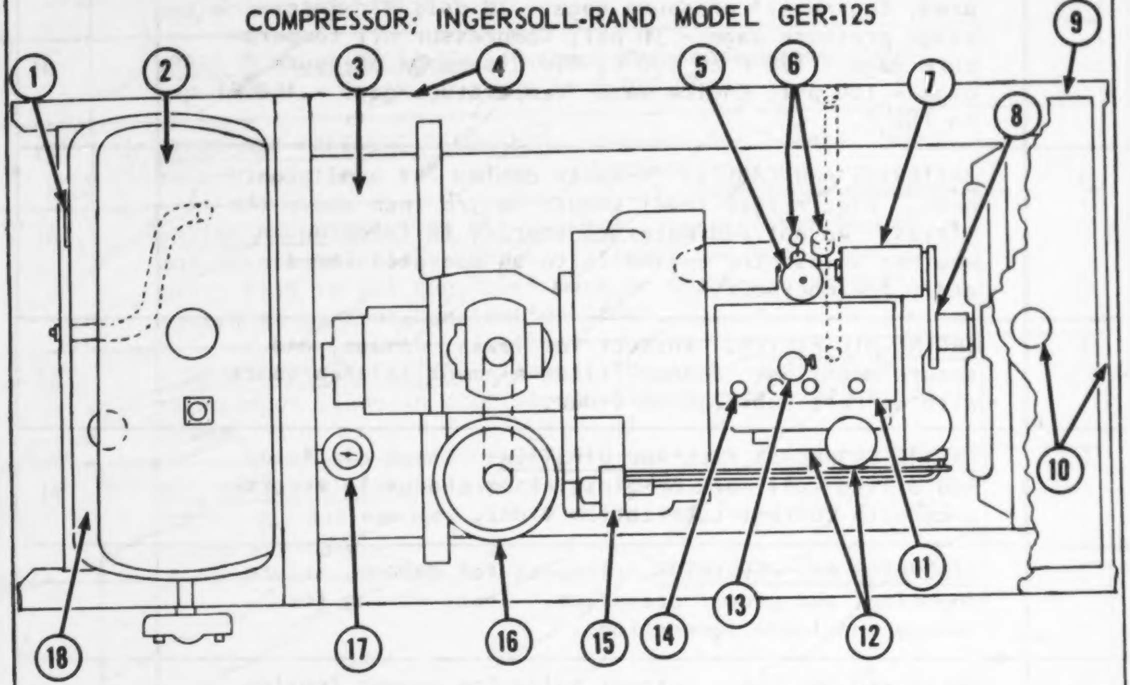
Figure 12—Continued.

PREVENTIVE MAINTENANCE SERVICES
QUARTERLY

TM 5-4310-221-15 COMPRESSOR

COMPRESSOR; INGERSOLL-RAND MODEL GER-125



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR. REF
1	**AIR RECEIVER-OIL SEPARATOR OIL LEVEL GAGE**. Check oil level. The needle will be midway between low and high markings. Add or change oil in accordance with current Lubrication Order.	
2	**FUEL TANK**. Inspect for loose mounting hardware and connections. Inspect fuel lines and valve for leaks. Check fuel level.	

Figure 14. Quarterly preventive maintenance services.

ITEM		PAR. REF
3	CONTROLS, INSTRUMENTS, GAGES, AND SWITCHES. Inspect for cracked lens, broken, bare, or frayed wires, secure mounting, and proper operation. Normal readings for instruments are: Ammeter - charge area, On serial numbers 125CR24901 through 125CR25400-green area; Engine oil pressure gage - 30 psi; Air interstage pressure gage - 30 psi; Compressor oil temperature gage - 170°F to 190°F; Air discharge pressure gage - 100 psi; Engine water temperature gage - 160°F to 180°F.	
4	BATTERIES AND CABLES. Inspect cables for hand tightness. Electrolyte level should be 3/8 inch above the plates. Do not add water to battery in freezing weather unless the engine is to be operated immediately for one hour.	
5	ENGINE OIL FILTER. Inspect for leaks, damage, and secure mounting. Change filter element in accordance with current Lubrication Order.	
6	ENGINE CRANKCASE FILL AND DIPSTICK. Check oil level. Add oil to full mark on dipstick or change in accordance with current Lubrication Order.	
7	GENERATOR AND REGULATOR. Inspect for damage, secure mounting, and proper operation. Check wiring for damage and loose connections.	
8	BELTS AND PULLEYS. Inspect belts for proper tension, wear, or frayed condition. See that pulleys are in good condition and securely mounted. Belt is properly adjusted when it can be deflected 1/2 inch at a point midway between pulleys.	
9	FIRE EXTINGUISHER. Check for full charge, broken seal, and secure mounting. A fully charged extinguisher weighs 2-3/4 lb.	
10	RADIATOR AND OIL COOLER. Inspect for leaks, loose connections, check radiator and coolant level.	
11	CYLINDER HEAD AND MANIFOLD. Inspect for leaks. Cylinder-head stud nut torque is 70 to 75 ft-lb; manifold nut torque is 25 to 30 ft-lb.	

Figure 14—Continued.

ITEM		PAR. REF
12	CARBURETOR, FUEL PUMP, FILTER, AND LINES. Check for leaks and secure mounting. Clean fuel filter sediment bowl.	
13	OVERSPEED GOVERNOR. Inspect for damage, secure mounting, and proper operation.	
14	SPARK PLUGS AND CABLES. Inspect for loose connections and damage. Spark plug gap is 0.030 inch.	
15	SPEED AND PRESSURE REGULATOR. Inspect for breaks, leaks, secure mounting, and proper adjustment.	
16	ENGINE AND COMPRESSOR AIR CLEANER. Inspect for damage and secure mounting. Check oil level and condition of oil. Fill to oil cup level mark or change in accordance with current Lubrication Order.	
17	COMPRESSOR OIL FILTER. Inspect for leaks and secure mounting. Clean in accordance with current Lubrication Order.	
18	AIR RECEIVER TANK. Inspect for leaks, corrosion, secure mounting, and damage. Check air lines for loose connections and damage.	

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Figure 14—Continued.

Section IV. TROUBLESHOOTING

34. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air compressor and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause. Any trouble beyond the scope of organizational maintenance shall be reported to field maintenance, 3rd echelon.

35. Engine Hard To Start or Fails To Start

Probable cause	*Possible remedy*
Fuel tank empty	Fill fuel tank.
Dirt, gum, or water in fuel tank and lines.	Clean fuel tank and lines (par. 61).
Defective fuel pump	Replace fuel pump (par. 60).
Carburetor out of adjustment.	Adjust carburetor (par. 59).
Weak or defective magneto	Check spark. Check breaker points. Adjust or replace defective breaker points (par. 72).
Defective ignition cables	Replace defective ignition cables (par. 71).
Engine out of time	Set timing (par. 72).
Defective starter	Replace starter (par. 66).
Defective batteries	Recharge or replace defective batteries (par. 65).
Defective ignition switch	Replace defective ignition switch (par. 80).

36. Engine Operates Erratically

Probable cause	*Possible remedy*
Defective spark plugs	Remove, clean, and adjust or replace spark plugs (par. 71).
Battery cable connection loose or shorted.	Tighten all connections and check for worn insulation; replace defective cables (par. 65).
Magneto breaker points burned, pitted, or out of adjustment.	Clean and adjust; replace burned or pitted breaker points (par. 72).
Air leaks between carburetor manifold and engine block.	Tighten or replace defective gaskets (par. 87).
Carburetor out of adjustment.	Adjust carburetor (par. 59).
Governor out of adjustment.	Adjust governor (par. 95).
Dirt, gum, or water in fuel system.	Clean fuel tank, lines, and sediment bowl (pars. 60 and 61).
Defective fuel pump	Replace fuel pump (par. 61).

37. Engine Lacks Power

Probable cause	*Possible remedy*
Carburetor out of adjustment.	Adjust carburetor (par. 59).
Engine speed too low	Adjust governor (par. 95).
Engine out of time	Time engine (par. 72).
Clogged air cleaner	Clean and service air cleaner (par. 30).

38. Engine Stops Suddenly

Probable cause	*Possible remedy*
Fuel tank empty	Fill fuel tank.
Dirt, gum, or water in fuel system.	Clean fuel tank, lines, and sediment bowl (pars. 60 and 61).
Magneto defective or breaker points out of adjustment.	Clean and adjust breaker points or replace defective magneto (par. 72).

39. Improper Oil Pressure

Probable cause	*Possible remedy*
Insufficient oil in crankcase.	Check oil level. Refill in accordance with current, lubrication order.
Defective oil pressure gage	Replace defective oil pressure gage (par. 80).
Clogged or broken oil lines	Clean or replace defective oil line (par. 80).
Defective oil pressure relief valve.	Replace defective oil pressure relief valve (par. 90).

40. Improper Generator Charging Rate

Probable cause	*Possible remedy*
Defective generator brushes	Replace brushes (par. 67).
Defective generator	Replace generator (par. 67).
Defective generator regulator.	Replace defective generator regulator (par. 68).
Defective wiring or loose connections.	Repair or replace defective wiring, and tighten loose connections (par. 82).
Defective or loose generator drive belt.	Tighten or replace defective drive belt (par. 67).

41. Engine Knocks

Probable cause	*Possible remedy*
Engine crankcase oil low	Add or change oil in accordance with current lubrication order.
Engine out of time	Time engine (par. 72).
Defective crankshaft or connecting rod bearings.	Replace defective bearings. Report this condition to field maintenance, 3rd echelon.

42. Engine Overheats

Probable cause	*Possible remedy*
Improper lubrication	Lubricate according to current lubrication order.
Radiator core passages clogged.	Flush radiator (par. 75).
Defective water pump	Replace water pump (par. 78).
Defective thermostat	Replace thermostat (par. 75).
Loose or defective fan belt	Tighten or replace fan belt (par. 67).
Engine out of time	Retime engine (par. 72).

43. Engine Backfires

Probable cause	*Possible remedy*
Engine out of time	Retime engine (par. 72).
Water in fuel	Drain fuel tank and refill.
Defective ignition switch	Replace ignition switch (par. 80).

44. Excessive Smoke From Engine Exhaust

Probable cause	*Possible remedy*
Carburetor out of adjustment or defective.	Adjust or replace carburetor (par. 59).
Choke partly closed	Open choke fully.
Too much oil in air cleaner	Service air cleaner in accordance with current lubrication order.

45. Compressor Overheats

Probable cause	*Possible remedy*
Compressor oil filter clogged.	Service compressor oil filter (par. 30).
Improper lubrication of compressor.	Lubricate in accordance with current lubrication order.
Radiator shutter closed	Open radiator shutter.
Loose or defective fan belt.	Adjust or replace fan belt (par. 67).

46. Lubricating Oil in Compressor Discharge

Probable cause	*Possible remedy*
Receiver-separator overfilled.	Fill receiver-separator in accordance with current lubrication order.
Receiver-separator element clogged.	Report this condition to field maintenance, 3d echelon.

47. Compressor Fails To Build Up Air Pressure

Probable cause	*Possible remedy*
Defective pressure regulator.	Adjust or replace pressure regulator (par. 101).

48. Excessive Compressor Oil Consumption

Probable cause	*Possible remedy*
Overfilling of compressor oil supply.	Drain compressor oil supply to proper level in accordance with current lubrication order.
Receiver-separator element clogged.	Report this condition to field maintenance, 3d echelon.

Section V. FIELD EXPEDIENT REPAIRS

49. General

Operator and organizational maintenance troubles may occur while the air compressor is operating in the field where supplies and repair parts are not available and normal corrective action cannot be performed. When this condition exists, the following expedient repairs may be used in emergencies, upon the decision of the unit commander. Equipment so repaired must be removed from operation as soon as possible and properly repaired before being placed in operation again.

50. Loss of Fuel

Trouble	*Expedient remedy*
Fuel line leaks	Clean area around leak. Wrap with available material and tape until damaged line can be replaced. Insert soft wood plug in hole to minimize fuel loss.

51. Engine Heats Up

Trouble	*Expedient remedy*
Coolant hose leaks	Wrap cracked area with available suitable material and tape. Keep coolant at proper operating level.

52. Batteries Low

Trouble	*Expedient remedy*
Defective batteries	Use jumper cables from the batteries of another piece of equipment that can supply the required electrical current for starting.
Battery cable damaged	Use battery cable from the other unit to start the engine.

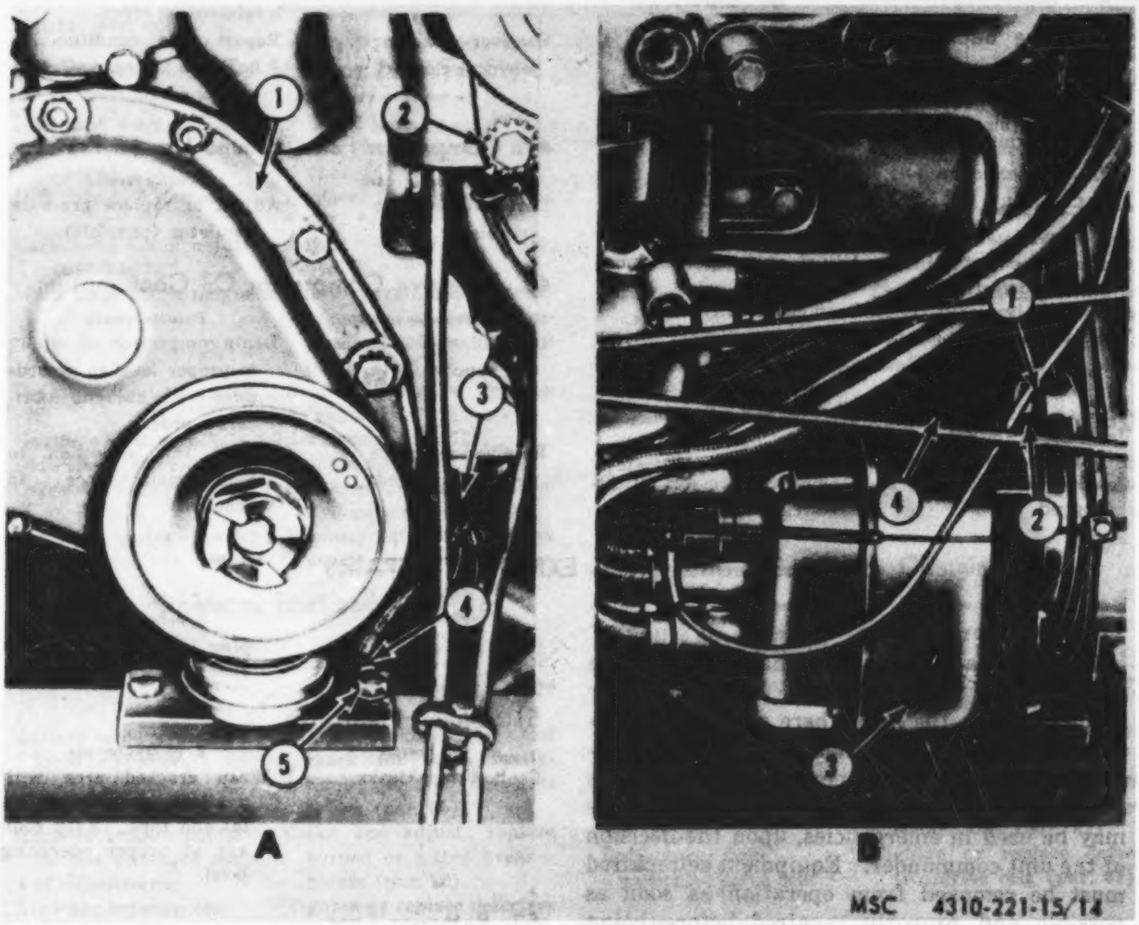
Section VI. RADIO INTERFERENCE SUPPRESSION

53. General Methods Used To Attain Proper Suppression

Essentially, suppression is attained by providing a low resistance path to ground for the stray currents. The methods used include shielding the ignition and high-frequency wires, grounding the frame with bonding straps, and using capacitors and resistors. For general information on radio interference suppression, see TM 11–483.

54. Interference Suppression Components

a. Primary Suppression Components. **The interference ground straps are illustrated on figure 14.**



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- **1 Timing gear cover**
- **2 Washer, lock, IET, ⅜ in.**
- **3 Ground strap**
- **4 Screw, cap, ⅜–16 x 1¼ in.**
- **5 Washer, lock, IET, ⅜ in.**

A—Motor radio suppression

- **1 Washer, lock, IET, ⅜ in.**
- **2 Screw, cap, ⅜–16 x 3⅜ in.**
- **3 Magneto**
- **4 Ground strap**

B—Magneto, radio suppression

Figure 14. Radio interference suppression components.

b. Secondary Suppression Components.

(1) *Tooth-type lockwashers*

(*a*) The generator is mounted on the left side of the engine and is grounded by internal-external toothed lockwashers.

(*b*) The starter is mounted on the left rear side of the engine and is grounded by internal-external toothed lockwashers.

(*c*) The generator regulator is mounted on the left side of engine on the housing panel and is grounded by internal-exterial toothed lockwashers.

(*d*) The magneto is mounted on the right front side of the engine and is grounded by internal-external toothed lockwashers.

(*e*) Motor ground strap is secured to the oil pan and frame with internal-external toothed lockwashers.

(2) *Shielded cables.*

(*a*) The generator is equipped with a shielded cable connecting the generator and generator regulator. For removal of the shielded cable and suppression components, refer to paragraph 67 and 68.

(*b*) For removal of the shielded ignition cable and shielded spark plugs, refer to paragraph 71.

***Caution:* Do not pull on cable or twist the braided shielding. Gently work the cable from side to side and free the rubber seal. Do not use sharp tools to install the rubber seal.**

55. Replacement of Suppression Components

a. General. Replace radio interference suppression components of the same size, type, and rating and they should be identical to the original parts. Special care must be taken to be certain there is a good metal-to-metal contact with washers and bonding straps.

b. Primary Suppression Components. Replace the interference ground straps as shown on figure 14.

c. Secondary Suppression Components.

(1) *Tooth-type lockwashers*

(*a*) Replace generator mounting washers (par. 67).

(*b*) Replace generator regulator mounting washers (par. 68).

(*c*) Replace starter mounting washers (par. 66).

(*d*) Replace magneto mounting washers (par. 72).

(*e*) Replace shielded ignition cable and spark plugs (par. 71).

(*f*) Replace motor ground strap (par. 136).

Section VII. HOUSING ASSEMBLY

56. General

The air compressor is completely inclosed by a sheet metal housing assembly consisting of a top cover, hinged side covers, side sheets, mounting brackets and plates, and frame bottom pans. The side covers allow access to the unit for operation and routine maintenance. The bottom pans protect the unit from dirt and dust and from damage if the unit should be towed over rough terrain.

57. Hinged Side Covers, Cover Latches, and Cover Supports

a. Removal. Remove the hinged side covers, cover latches, cover supports, top cover, toolbox, and lifting bail as instructed on figure 15.

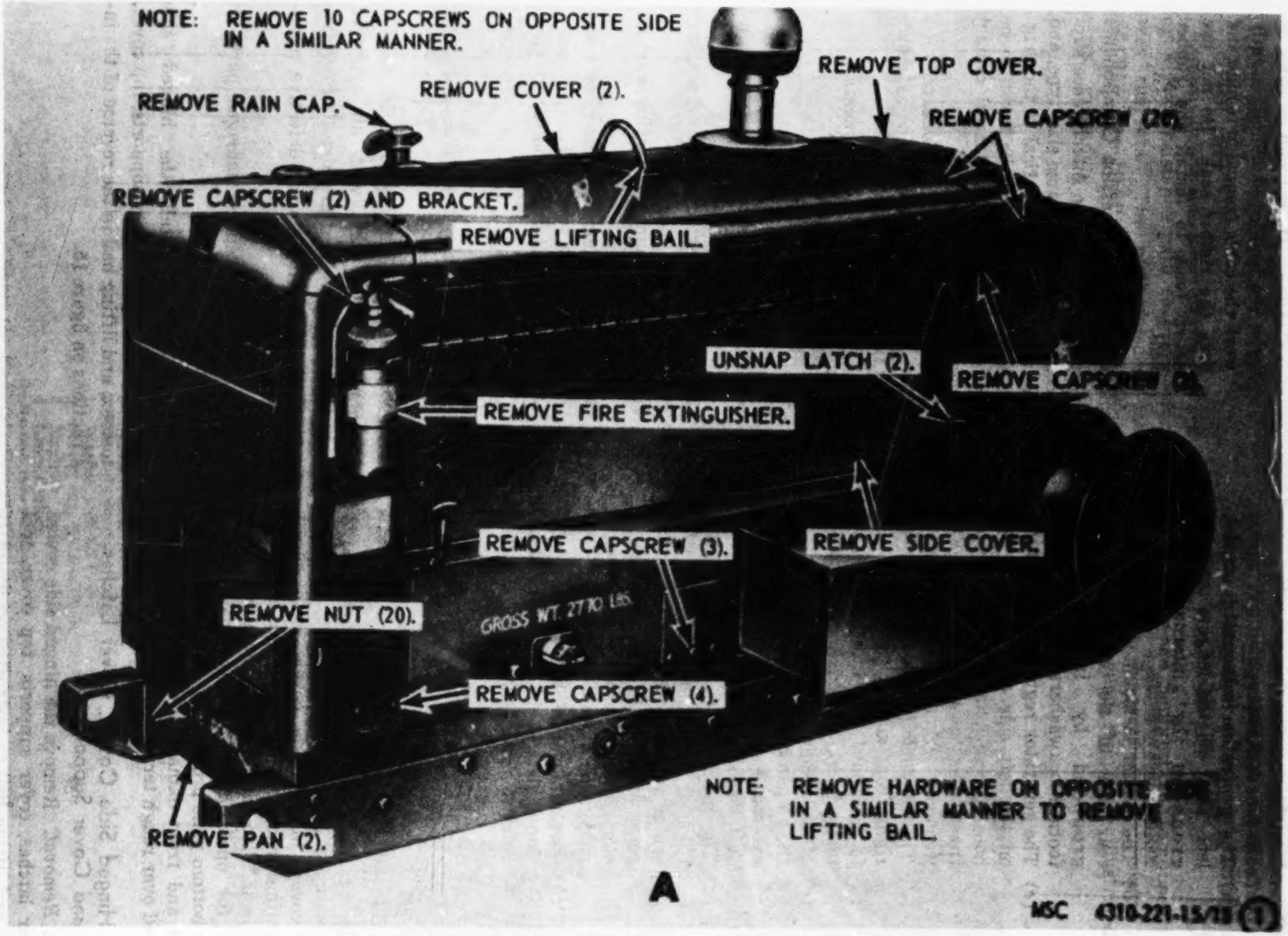
b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for defective conditions.

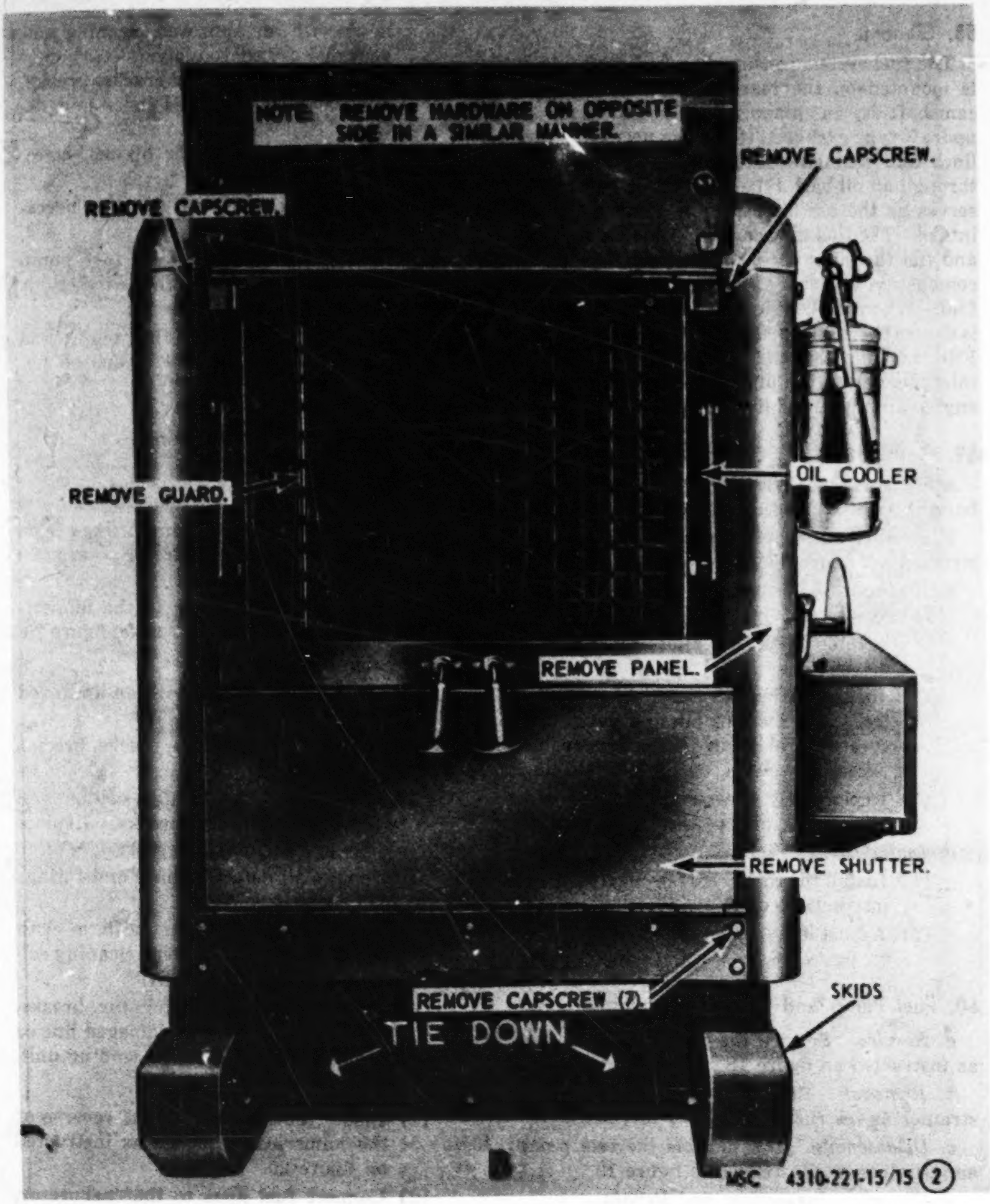
(3) Repair or replace damaged parts as necessary.

c. Installation. Install the hinged side covers, cover latches, cover supports, top cover, toolbox, and lifting bail in the reverse of the instructions on figure 15.


NOTE: REMOVE 10 CAPSCREWS ON OPPOSITE SIDE IN A SIMILAR MANNER.
REMOVE RAIN CAP.
REMOVE COVER (2).
REMOVE TOP COVER.
REMOVE CAPSCREW (20).
REMOVE CAPSCREW (2) AND BRACKET.
REMOVE LIFTING BAIL.
UNSNAP LATCH (2).
REMOVE CAPSCREW (2).
REMOVE FIRE EXTINGUISHER.
REMOVE CAPSCREW (3).
REMOVE SIDE COVER.
REMOVE NUT (20).
GROSS WT. 2770 LBS.
REMOVE CAPSCREW (4).
NOTE: REMOVE HARDWARE ON OPPOSITE SIDE IN A SIMILAR MANNER TO REMOVE LIFTING BAIL.
REMOVE PAN (2).
A
MSC 4310-221-15/15 (1)

A—Housing side panel, top cover, and bottom pan

Figure 15. Housing, side panels, top cover, and shutters, removal and installation.


NOTE: REMOVE HARDWARE ON OPPOSITE SIDE IN A SIMILAR MANNER.
REMOVE CAPSCREW.
REMOVE CAPSCREW.
REMOVE GUARD.
OIL COOLER
REMOVE PANEL.
REMOVE SHUTTER.
REMOVE CAPSCREW (7).
SKIDS
TIE DOWN
MSC 4310-221-15/15 ②

B—Shutters and guard
Figure 15—Continued.

58. General

The fuel system consists of a fuel tank which is mounted on the rear of the compressor, a camshaft-driven diaphragm-type fuel pump, updraft-type carburetor, and the necessary fuel lines and fittings. The intake air is drawn through an oil-bath type air cleaner, which also serves as the air filter for the compressor air intake. The fuel is vaporized in the carburetor, and the fuel air mixture is then carried to the combustion chamber through the intake manifold. When the compressor is in operation, air is drawn through a prefilter into the air cleaner. Filtered air passes through the compressor air inlet elbow into the unloader, and through the engine air inlet hose into the carburetor.

59. Carburetor

a. Carburetor Adjustment. Adjust the carburetor as instructed on figure 16.

b. Removal. Remove the carburetor as instructed on figure 17.

c. Cleaning and Inspection.

(1) Wash exterior surfaces of the carburetor with an approved cleaning solvent.

(2) Inspect carburetor for cracks, breaks, leaks, and loose or missing parts. Inspect control linkage for unserviceable, excessively worn, or corroded parts.

(3) Replace any excessively worn or unserviceable parts.

d. Installation.

(1) Install the carburetor in reverse of the instructions on figure 17.

(2) Adjust the carburetor as instructed on figure 16.

60. Fuel Pump and Strainer Assembly

a. Service. Service the fuel pump strainer as instructed on figure 18.

b. Removal. Remove the fuel pump and strainer as instructed on figure 18.

c. Disassembly. Disassemble the fuel pump and strainer as illustrated on figure 19.

d. Cleaning. Inspection, and Repair.

(1) Clean the fuel pump and strainer exterior metal surfaces and sediment bowl with an approved cleaning solvent and dry thoroughly.

(2) Inspect fuel pump for cracks, breaks, and damaged threaded holes and fittings.

(3) Inspect the screen for breaks, holes, and deterioration.

(4) Replace all defective parts as necessary.

e. Reassembly. Reassemble the fuel pump and strainer in the reverse of the instructions on figure 19.

f. Installation. Install the fuel pump and strainer in reverse of the instructions on figure 18.

61. Fuel Tank, Lines, and Fittings

a. Removal.

(1) Drain fuel tank.

(2) Disconnect fuel lines and fittings from fuel pump and carburetor (pars. 59 and 60).

(3) Remove the fuel tank in the numerical sequence as instructed on figure 20.

b. Cleaning and Inspection.

(1) Clean the fuel tank with an approved cleaning solvent.

(2) Inspect tank for leaks, cracks, breaks, and dents.

(3) Inspect the mounting saddle and straps for bends or breaks. Replace damaged parts as necessary.

(4) Replace all defective lines and fittings as necessary.

(5) Clean the transmitter with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(6) Inspect the transmitter for breaks, cracks, and broken or damaged line or float. Replace defective sending unit.

c. Installation.

(1) Install the fuel tank in the reverse of the numerical sequence as instructed on figure 20.

(2) Connect fuel lines to the carburetor, fuel pump, and tank (par. 59 and 60).

(3) Fill fuel tank.

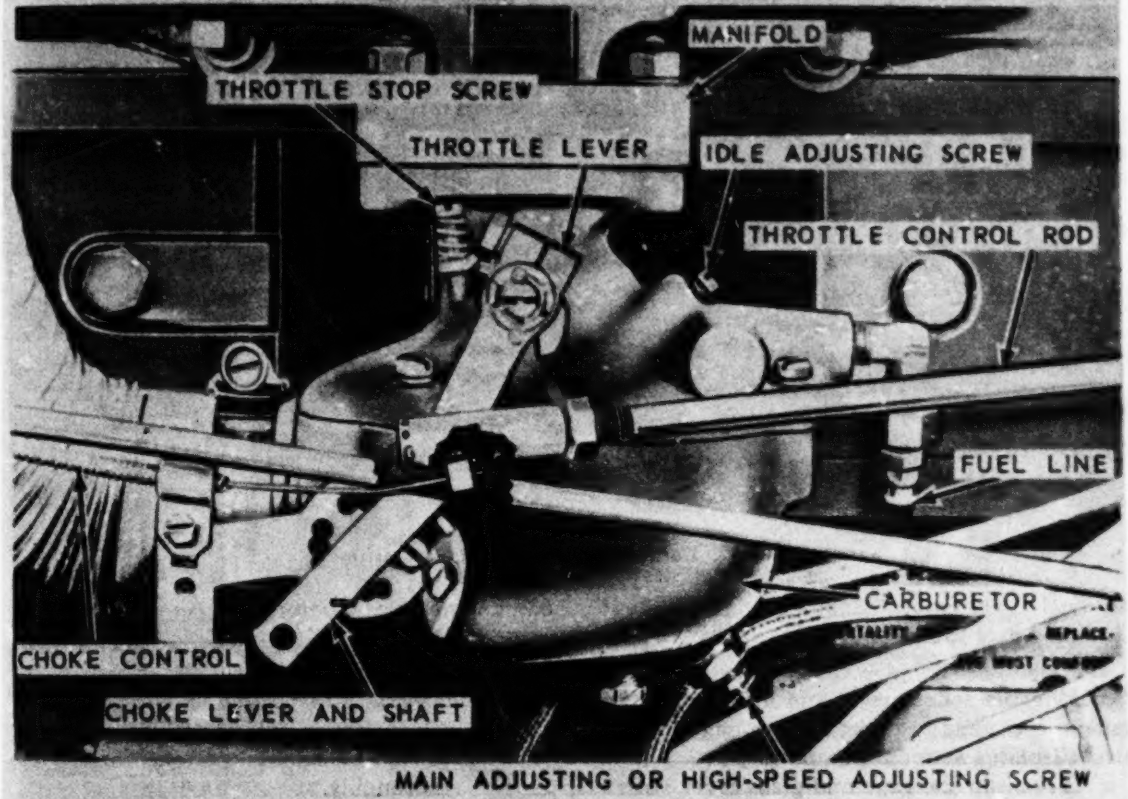
STEP 1. TURN FUEL COCK (FIG. 6C).

STEP 2. TURN THROTTLE STOP SCREW IN OR OUT SO THE THROTTLE DISK IS SLIGHTLY OPEN.

STEP 3. SET THROTTLE CONTROL LEVER (FIG. 6) TO 1/3 OPEN POSITION.

STEP 4. PULL CHOKE CONTROL ALL THE WAY OUT. AFTER ENGINE STARTS PUSH CHOKE CONTROL HALF-WAY IN.

STEP 5. ALLOW ENGINE TO REACH OPERATING TEMPERATURE AND PUSH CHOKE ALL THE WAY IN.


MANIFOLD
THROTTLE STOP SCREW
THROTTLE LEVER
IDLE ADJUSTING SCREW
THROTTLE CONTROL ROD
FUEL LINE
CARBURETOR
CHOKE CONTROL
CHOKE LEVER AND SHAFT
MAIN ADJUSTING OR HIGH-SPEED ADJUSTING SCREW

STEP 6. MAIN ADJUSTMENT SETTING MAY BE OBTAINED BY OPENING THE THROTTLE TO 1/4 OPEN. TURN ADJUSTMENT SCREW CLOCKWISE TO SHUT OFF FUEL UNTIL ENGINE SPEED DECREASES OR BEGINS TO MISS DUE TO LEAN MIXTURE. TURN SCREW COUNTERCLOCKWISE UNTIL ENGINE RUNS SMOOTHLY.

STEP 7. TURN IDLE ADJUSTING SCREW IN UNTIL ENGINE OPERATES ROUGHLY OR JERKS. BACK OUT SCREW UNTIL ENGINE OPERATES SMOOTHLY.

MSC 4310-221-15/16

Figure 16. Carburetor adjustment.

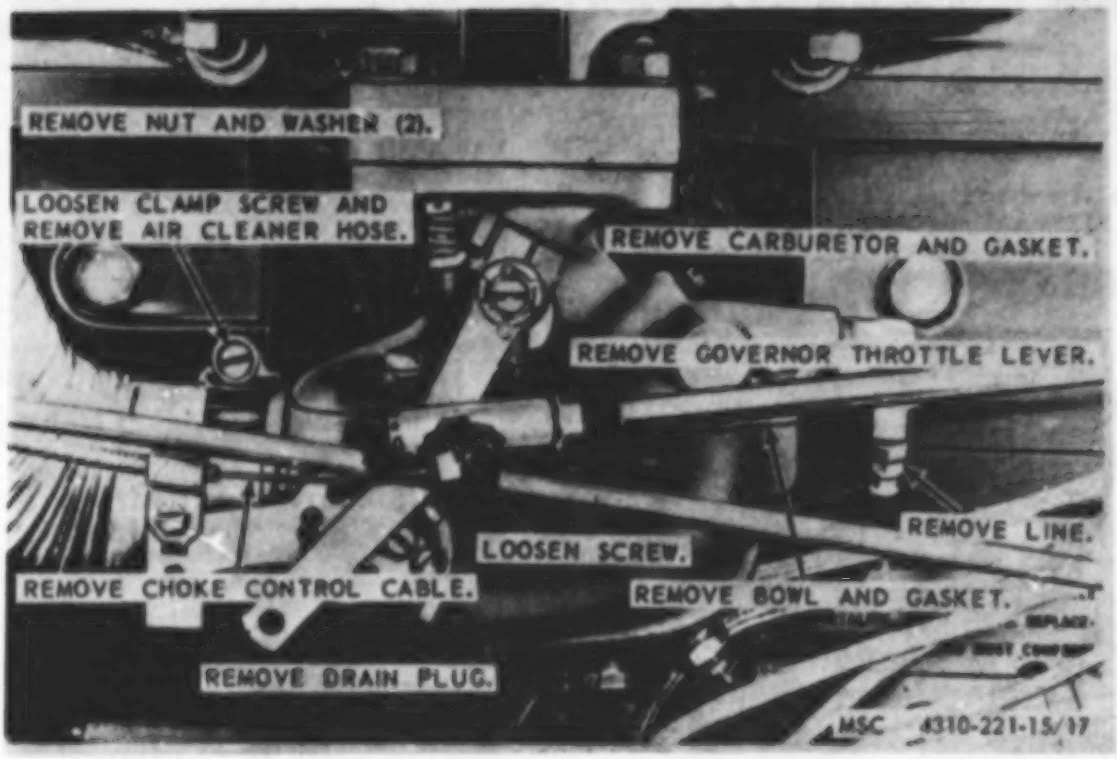

REMOVE NUT AND WASHER (2).
LOOSEN CLAMP SCREW AND REMOVE AIR CLEANER HOSE.
REMOVE CARBURETOR AND GASKET.
REMOVE GOVERNOR THROTTLE LEVER.
REMOVE LINE.
LOOSEN SCREW.
REMOVE CHOKE CONTROL CABLE.
REMOVE BOWL AND GASKET.
REMOVE DRAIN PLUG.
MSC 4310-221-15/17

Figure 17. Carburetor, removal and installation.

62. Fuel Level Gage (Serial Nos. 125CR22346 through 125CR22545)

a. Removal. Remove the fuel level gage by removing the four screws and lockwashers securing level gage to tank; remove gage.

b. Cleaning, Inspection, and Repair.

(1) Clean the gage and glass cover with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Inspect the gage for dents, broken glass, damaged float, or bent needle. Replace defective parts as necessary.

c. Installation. Install the fuel level gage with the four lockwashers and screws.

63. Engine and Compressor Air Cleaner

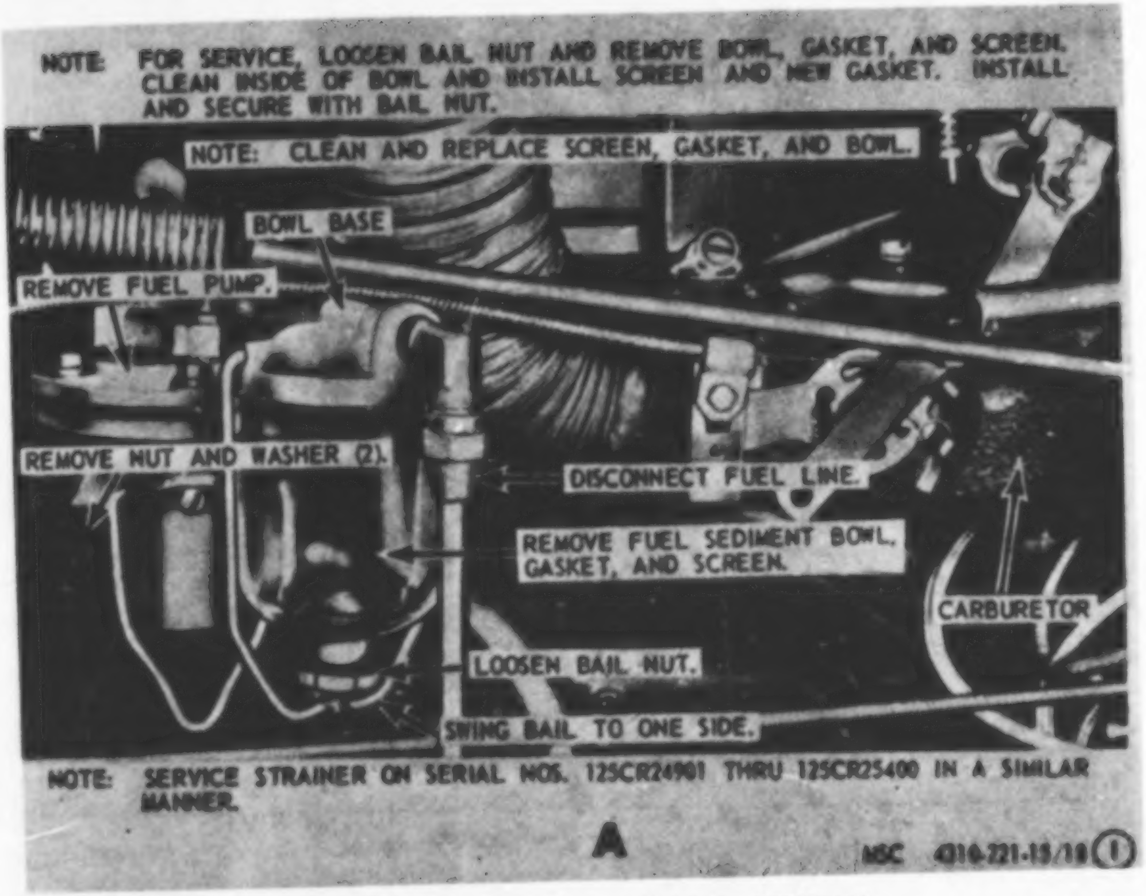
a. Removal. Remove the air cleaner in the numerical sequence as instructed on figure 21.

b. Cleaning and Inspection.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect air cleaner body, brackets, cap, and oil cup for dents, cracks, or breaks. Replace defective parts as necessary.

c. Installation. Install the air cleaner in the reverse of the numerical sequence as instructed on figure 21.



NOTE: FOR SERVICE, LOOSEN BAIL NUT AND REMOVE BOWL, GASKET, AND SCREEN. CLEAN INSIDE OF BOWL AND INSTALL SCREEN AND NEW GASKET. INSTALL AND SECURE WITH BAIL NUT.

NOTE: CLEAN AND REPLACE SCREEN, GASKET, AND BOWL.

REMOVE FUEL PUMP.

REMOVE NUT AND WASHER (2).

DISCONNECT FUEL LINE.

REMOVE FUEL SEDIMENT BOWL, GASKET, AND SCREEN.

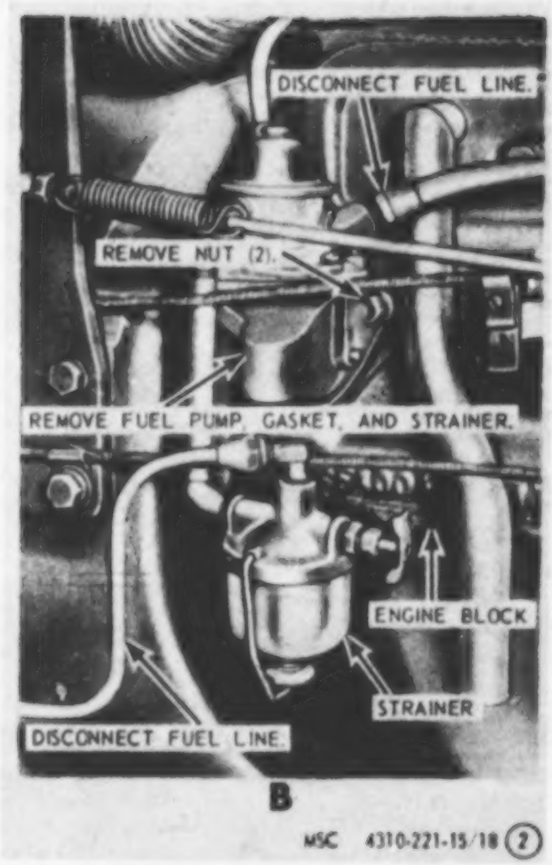
LOOSEN BAIL NUT.

SWING BAIL TO ONE SIDE.

NOTE: SERVICE STRAINER ON SERIAL NOS. 125CR24901 THRU 125CR25400 IN A SIMILAR MANNER.

A—Fuel pump and strainer (serial Nos. 125CR22346 through 125CR22545)

Figure 18. Fuel pump strainer, removal and installation.


DISCONNECT FUEL LINE.
REMOVE NUT (2).
REMOVE FUEL PUMP, GASKET, AND STRAINER.
ENGINE BLOCK
STRAINER
DISCONNECT FUEL LINE.
B
MSC 4310-221-15/18 ②

B—Fuel pump and strainer (serial Nos. 125CR24901 through 125CR25400)
Figure 18—Continued.

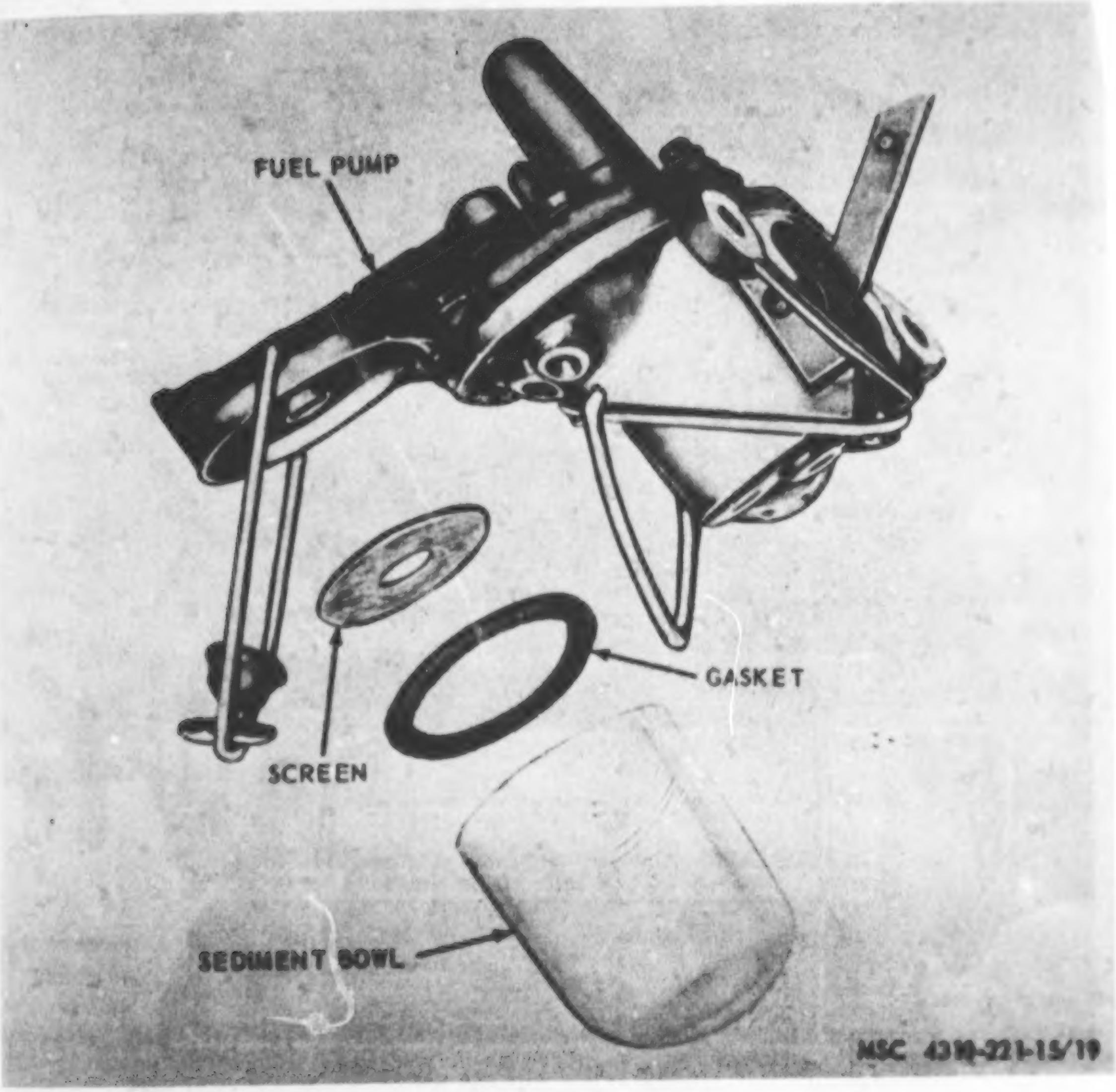

FUEL PUMP
GASKET
SCREEN
SEDIMENT BOWL
MSC 4310-221-15/19

Figure 19. Fuel pump and strainer—partially exploded view (serial Nos. 125CR22346 through 125CR22545).

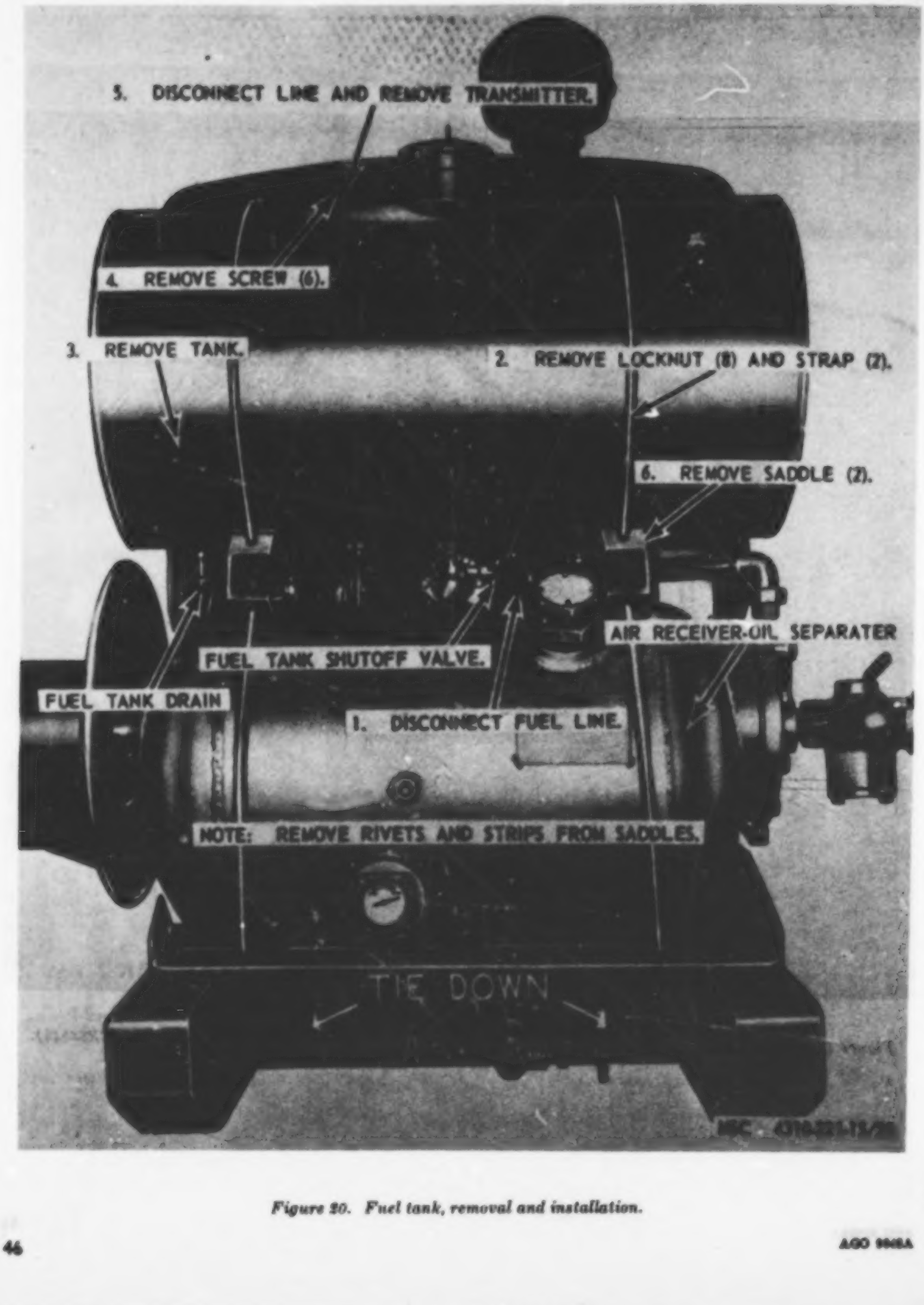

5. DISCONNECT LINE AND REMOVE TRANSMITTER.
4. REMOVE SCREW (6).
3. REMOVE TANK.
2. REMOVE LOCKNUT (8) AND STRAP (2).
6. REMOVE SADDLE (2).
AIR RECEIVER-OIL SEPARATER
FUEL TANK SHUTOFF VALVE.
FUEL TANK DRAIN
1. DISCONNECT FUEL LINE.
NOTE: REMOVE RIVETS AND STRIPS FROM SADDLES.
TIE DOWN

Figure 20. Fuel tank, removal and installation.

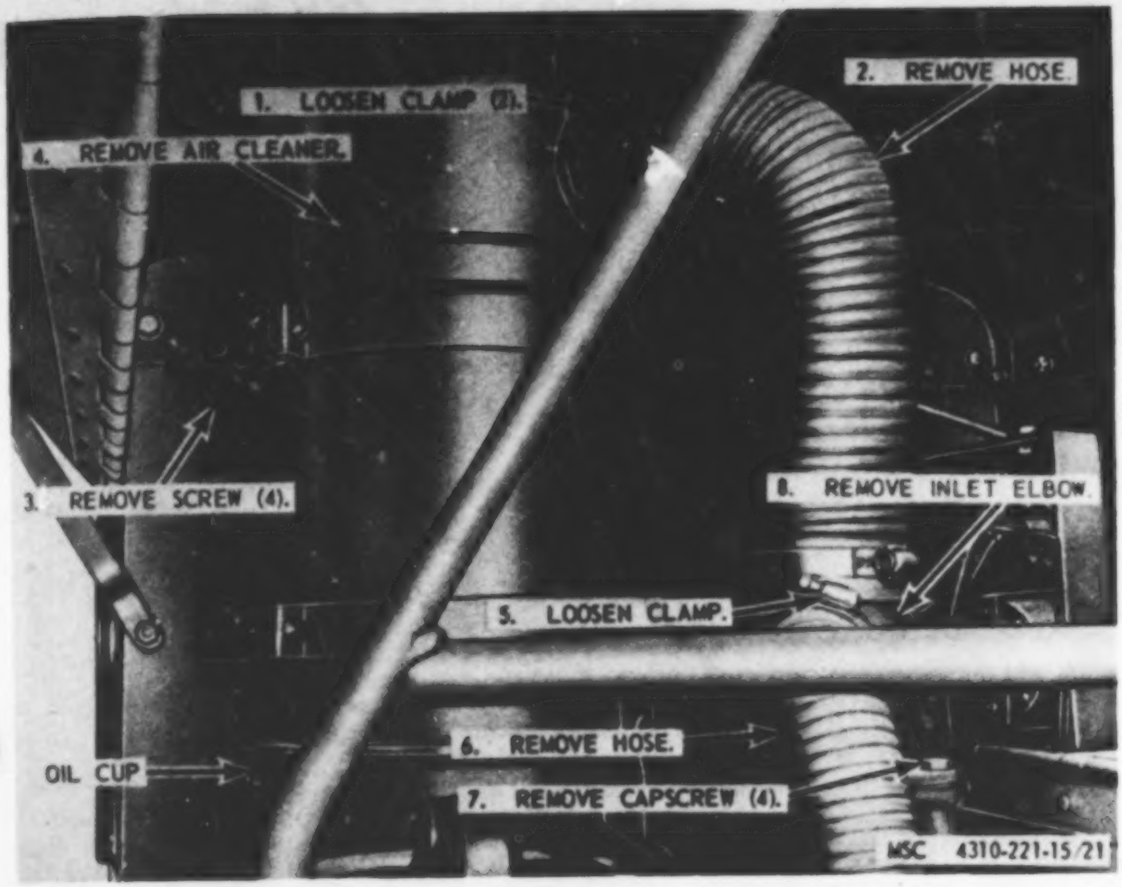

1. LOOSEN CLAMP (2).
2. REMOVE HOSE.
4. REMOVE AIR CLEANER.
3. REMOVE SCREW (4).
8. REMOVE INLET ELBOW.
5. LOOSEN CLAMP.
6. REMOVE HOSE.
OIL CUP
7. REMOVE CAPSCREW (4).
MSC 4310-221-15/21

Figure 21. Engine and compressor air cleaner, removal and installation.

Section IX. ELECTRICAL SYSTEM

64. General

The 24-volt, negative-grounded electrical system consists of storage batteries, engine starter, generator, and generator regulator. The two 12-volt batteries are connected in series and are used to energize the engine starter. The starter uses a solenoid-operated overrunning clutch, which engages the pinion with the ring gear on the flywheel for starting. The batteries are maintained in a full state of charge by a 24-volt generator, which is belt-driven from the engine crankshaft pulley. The generator charging rate is automatically controlled by a radio-suppressed, automotive-type generator regulator.

65. Batteries, Cables, Battery Box

a. Removal.

(1) Remove the battery box cover as instructed on figure 22.

(2) Remove the batteries and cables as instructed on figure 22.

(3) Remove the battery box as instructed on C, figure 22.

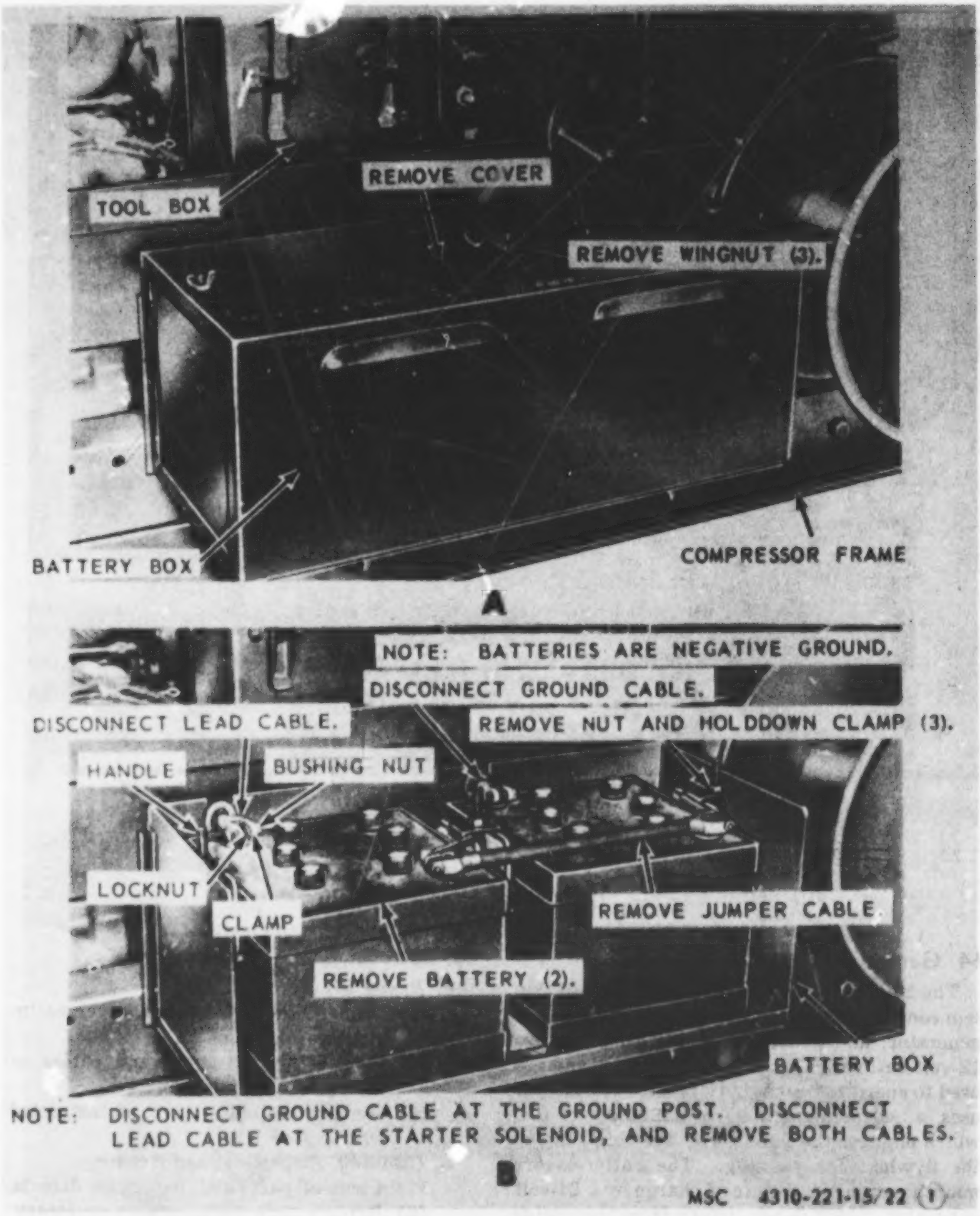
b. Cleaning, Inspection, and Repair.

(1) Clean all parts and inspect for defects.

(2) Replace defective parts as necessary.

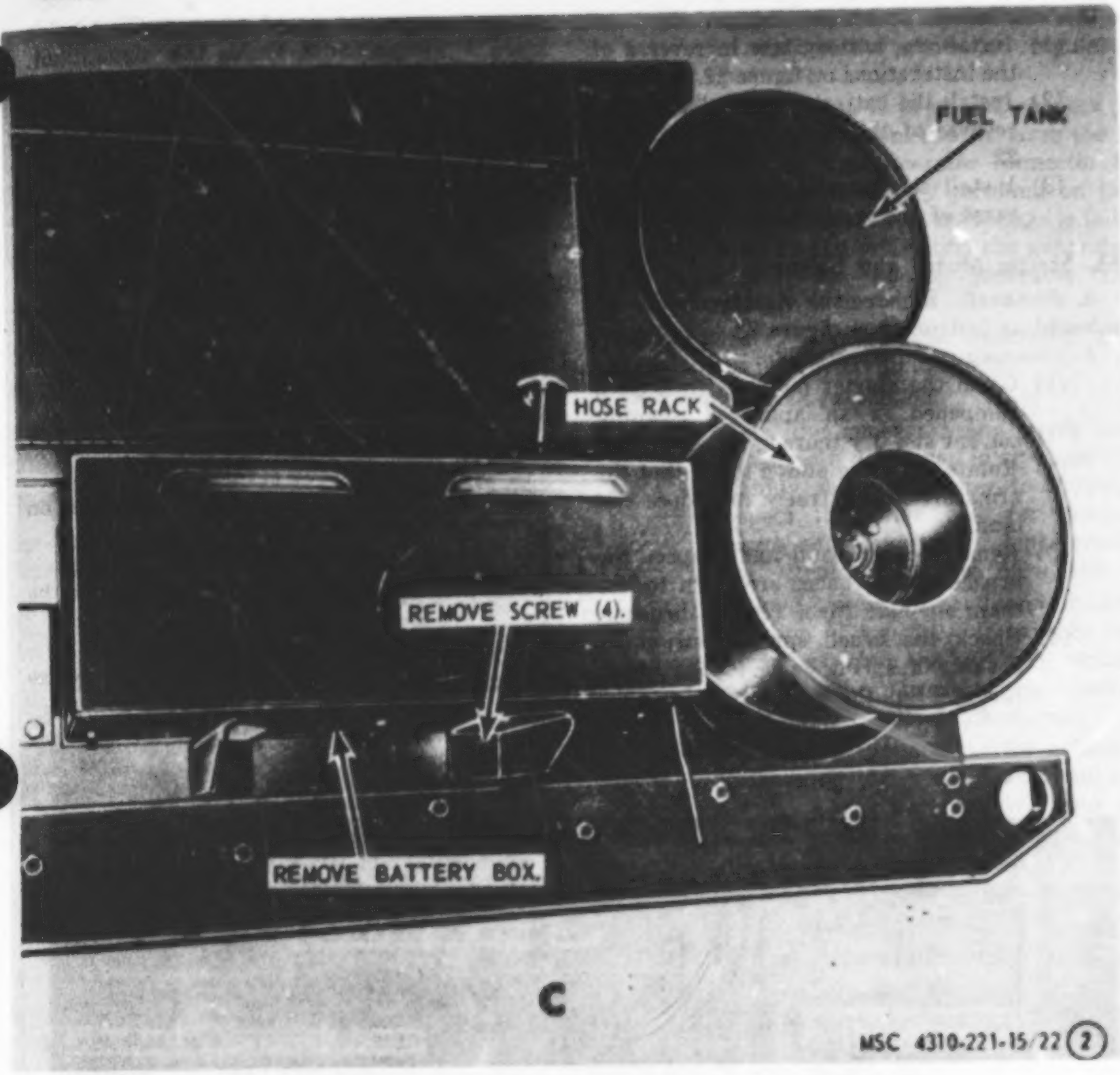
c. Test.

(1) Test the batteries with a hydrometer. If the specific gravity reads below


TOOL BOX
REMOVE COVER
REMOVE WINGNUT (3).
BATTERY BOX
COMPRESSOR FRAME
A
NOTE: BATTERIES ARE NEGATIVE GROUND.
DISCONNECT GROUND CABLE.
DISCONNECT LEAD CABLE.
REMOVE NUT AND HOLDDOWN CLAMP (3).
HANDLE
BUSHING NUT
LOCKNUT
CLAMP
REMOVE JUMPER CABLE.
REMOVE BATTERY (2).
BATTERY BOX
NOTE: DISCONNECT GROUND CABLE AT THE GROUND POST. DISCONNECT LEAD CABLE AT THE STARTER SOLENOID, AND REMOVE BOTH CABLES.
B
MSC 4310-221-15/22 (1)

A—Battery box cover, removal
B—Batteries and cables

Figure 22. Batteries, cables, and box, removal and installation.



C—Battery box
Figure 22—Continued.

1.225, recharge the batteries. Test the batteries after recharging. A fully charged battery should read between 1.280 and 1.300.

(2) For hydrometer specific gravity temperature correction, refer to TM 9-6140-200-15.

(3) Hydrometer readings should be taken before adding a battery solution or after adding solution and charging the battery.

(4) Replace a defective battery as necessary.

d. Adjustment of Cable Lugs.

(1) Place the lug clamp handle in the up position.

(2) Loosen or tighten the adjusting nut on the lug clamp to make a friction-fit on the battery post; tighten the locknut.

(3) Push the lug clamp down parallel to the lug clamp.

e. Installation.

(1) Install the battery box in reverse of the instructions on figure 22.

(2) Install the batteries and cables in the reverse of the instructions on figure 22.

(3) Install the battery box cover in reverse of the instructions on figure 22.

66. Starter Motor and Solenoid

a. Removal. Remove the starter motor and solenoid as instructed on figure 23.

b. Cleaning and Inspection.

(1) Clean the starter motor with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Rotate the drive pinion to see that the armature turns freely and does not bind.

(3) Remove cover band and inspect the brushes. If brushes are worn to less than one-half inch, replace brushes.

(4) Check the brush spring tension by hooking a spring scale to the brush spring. Pull the brush away from the commutator and measure the tension as the brush leaves the commutator. The correct tension is 24 ounces.

(5) Examine the teeth of the starter motor pinion and the flywheel ring gear for good condition. Check to see that the shift lever moves freely, and the pinion engaging mechanism does not bind. Replace a defective starter.

c. Installation. Install the starter motor and solenoid in reverse of the instructions on figure 23.

d. Brush Replacement.

(1) *Removal.*

 (*a*) Remove the starter as instructed in *a.* above.

 (*b*) Remove the cover band.

 (*c*) Remove the brushes as instructed on figure 24.

(2) *Installation.*

 (*a*) Install the brushes in reverse of the instructions on figure 24.

 (*b*) Install the cover band.

 (*c*) Install the starter motor in reverse of the instructions in *a* above.

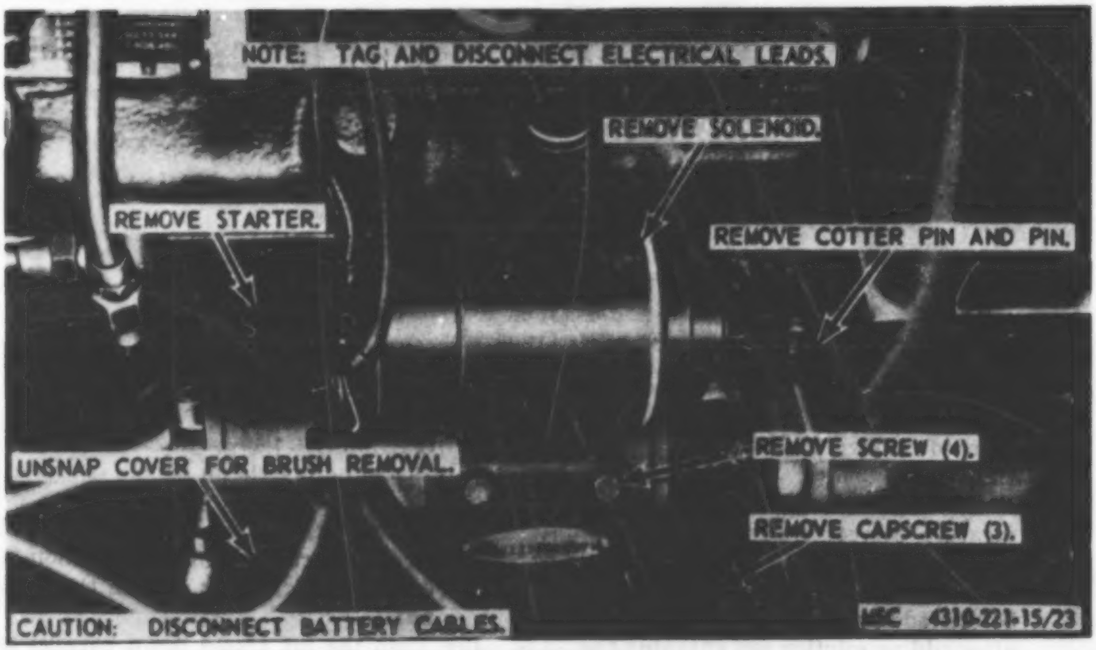

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS.
REMOVE SOLENOID.
REMOVE STARTER.
REMOVE COTTER PIN AND PIN.
REMOVE SCREW (4).
UNSNAP COVER FOR BRUSH REMOVAL.
REMOVE CAPSCREW (3).
CAUTION: DISCONNECT BATTERY CABLES.
MEC 4310-221-15/23

Figure 23. Starter motor and solenoid, removal and installation.

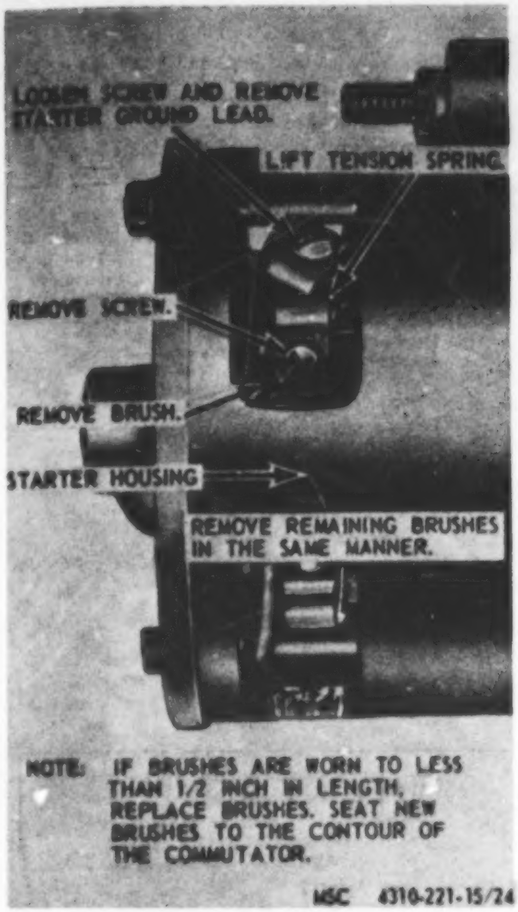

LOOSEN SCREW AND REMOVE STARTER GROUND LEAD.
LIFT TENSION SPRING.
REMOVE SCREW.
REMOVE BRUSH.
STARTER HOUSING
REMOVE REMAINING BRUSHES IN THE SAME MANNER.
NOTE: IF BRUSHES ARE WORN TO LESS THAN 1/2 INCH IN LENGTH, REPLACE BRUSHES. SEAT NEW BRUSHES TO THE CONTOUR OF THE COMMUTATOR.
MSC 4310-221-15/24

Figure 24. Starter brush replacement.

67. Generator

a. *Testing.*

(1) Disconnect the generator cable as instructed on figure 25.

(2) Connect a suitable voltmeter, placing one test lead in the A socket in the connector and the other test lead to a ground anywhere on the compressor unit.

(3) Start the engine (fig. 7).

(4) Increace the speed of the engine; the voltage output of the generator should read between 25 and 27 volts maximum on the voltmeter. If the voltage reading is higher or lower than the specified value above, the generator regulator is out of adjustment. Adjust or replace the generator regulator (par. 68).

(5) If no voltage is produced, connect a jumper wire momentarily from the B socket of the generator connector to the positive battery terminal on the starter solenoid. If no voltage is indicated on the voltmeter, the generator is defective. Replace generator (fig. 25).

b. *Removal.* Remove the generator and drive belt as instructed on figure 25.

c. *Cleaning and Inspection.*

(1) Clean the generator and drive belt with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Inspect the drive belt for cracks, breaks, and frayed or stretched condition. Replace defective drive belt.

(3) Remove the cover band and inspect condition of brushes. If brushes are worn to less than one half inch, replace brushes. Check brush spring tension. The correct tension is 28 ounces.

(4) Inspect the commutator for evidence of burning or pitting and out-of-round. Check for excessive wear on the commutator segments and high mica between segments.

(5) Check bearings for free rolling and unusual noises (TM 9–214).

(6) Replace defective generator as necessary.

d. *Installation.* Install the generator assembly in reverse of the instructions on figure 25.

e. *Brush Replacement.*

(1) *Removal.*

(*a*) Remove the generator as instructed in *b.* above.

(*b*) Remove cover band.

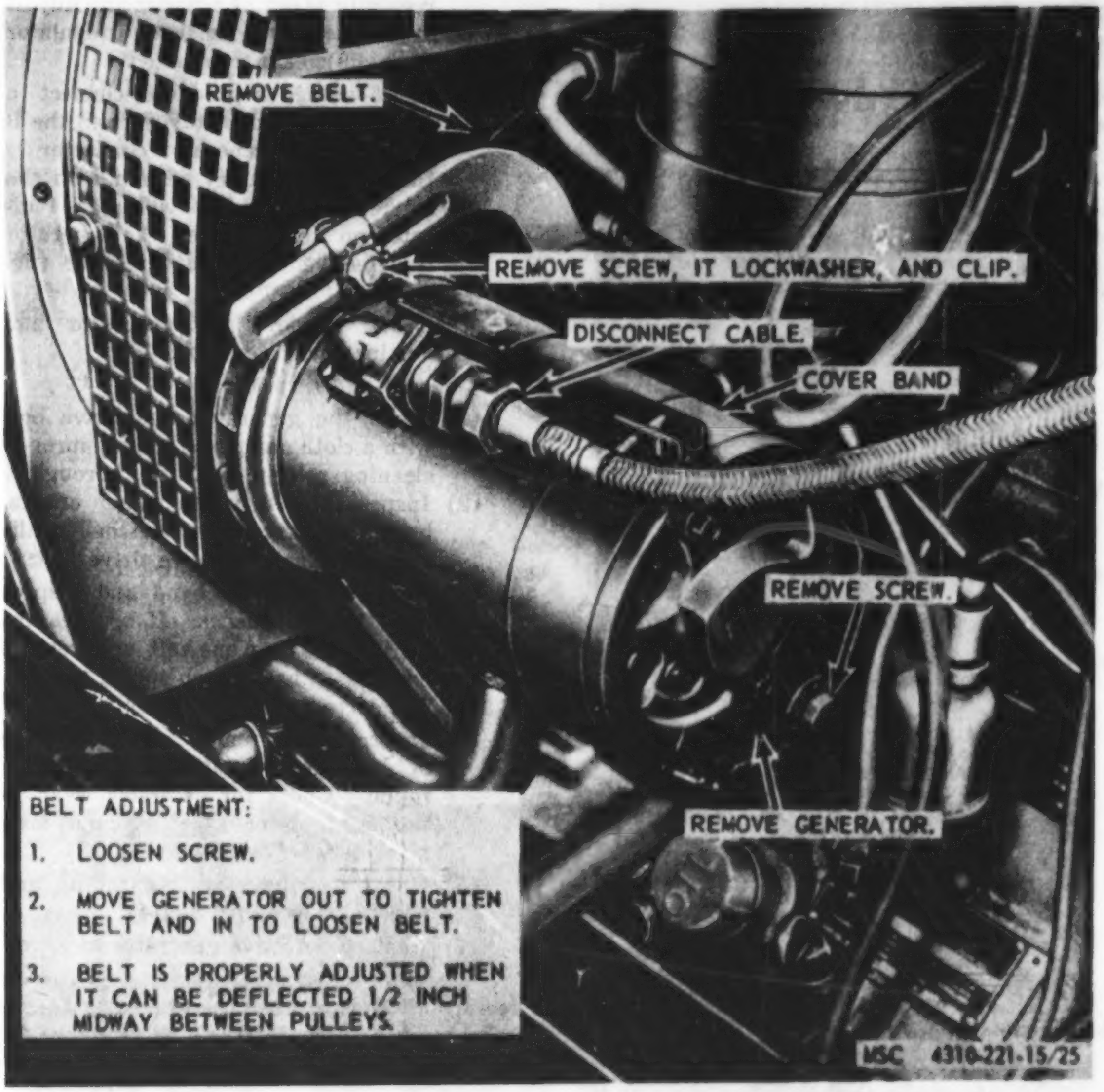
(*c*) Remove the brushes as instructed on figure 26.

(2) *Installation.*

(*a*) Install the brushes in reverse of the instructions on figure 26.

(*b*) Install the cover band.

(*c*) Install the generator as instructed in *d.* above.


REMOVE BELT.
REMOVE SCREW, IT LOCKWASHER, AND CLIP.
DISCONNECT CABLE.
COVER BAND
REMOVE SCREW.
REMOVE GENERATOR.
MSC 4310-221-15/25

BELT ADJUSTMENT:

1. LOOSEN SCREW.
2. MOVE GENERATOR OUT TO TIGHTEN BELT AND IN TO LOOSEN BELT.
3. BELT IS PROPERLY ADJUSTED WHEN IT CAN BE DEFLECTED 1/2 INCH MIDWAY BETWEEN PULLEYS.

Figure 25. Generator, removal, installation, and belt adjustment.

68. Generator Regulator

a. Removal. Remove the generator regulator in the numerical sequence as instructed on figure 27.

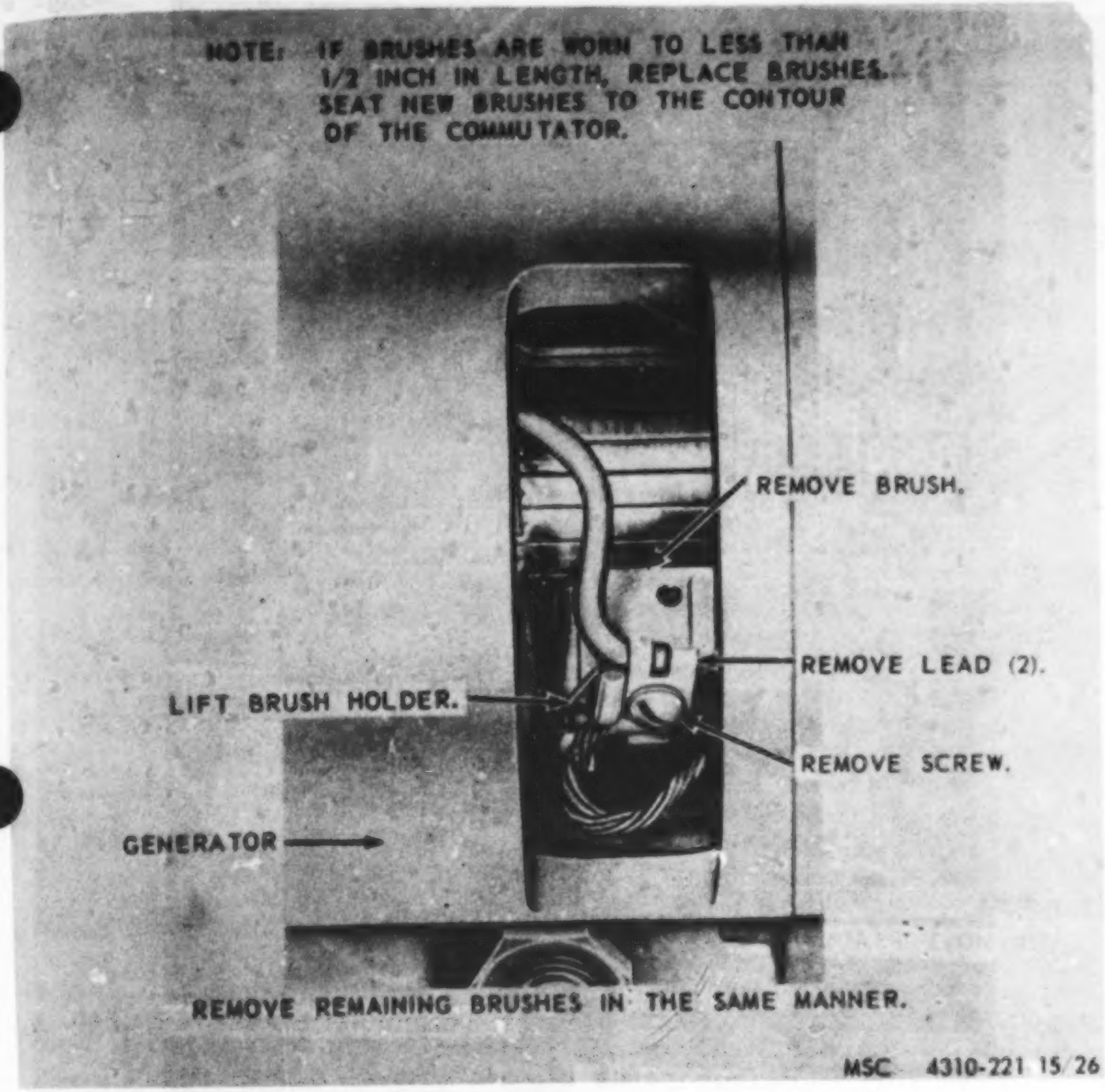
b. Cleaning and Inspection.

(1) Cleaning the generator regulator with a lint-free cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect the generator regulator for breaks and other damage. Replace defective generator regulator.

c. Installation. Install the generator regulator in the reverse of the numerical sequence as instructed on figure 27.

Note. The engine generator must be polarized whenever the leads to the generator or regulator have been removed or any adjustments have been made to the generator regulator. Failure to polarize the generator may cause the regulator contacts to be damaged by vibration, heavy arcing, and burning.



NOTE: IF BRUSHES ARE WORN TO LESS THAN 1/2 INCH IN LENGTH, REPLACE BRUSHES. SEAT NEW BRUSHES TO THE CONTOUR OF THE COMMUTATOR.

REMOVE REMAINING BRUSHES IN THE SAME MANNER.

MSC 4310-221 15/26

Figure 26. Generator brush replacement.

Note. Polarize the generator by disconnecting the field lead at the regulator and momentarily connecting a jumper lead between the gnerator field terminal and the regulator battery terminal. Remove the jumper lead and connect field lead to the regulator (A, fig. 27).

d. Test and Adjustment.

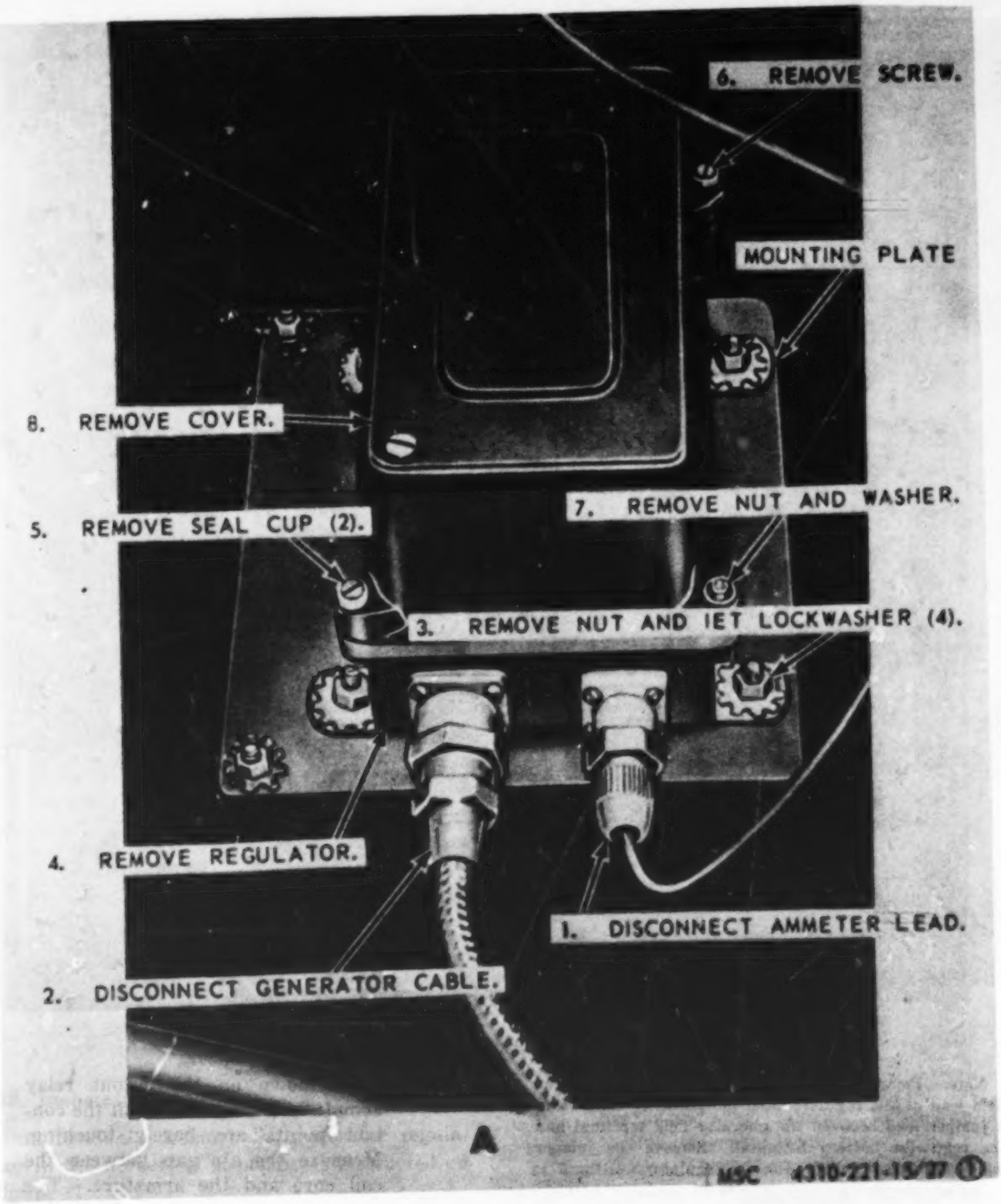
(1) *Mechanical adjustments.*

(*a*) Disconnect the regulator to battery cable.

(*b*) Remove regulator cover (A, fig. 27).

(*c*) Press down on the cutout relay armature (A, fig. 27) until the contact points are barely touching. Measure the air gap between the coil core and the armature. The correct air gap for the cutout relay is 0.048 inch.

Note. Measure the cutout relay air gap between the armature and the core, not between the brass pin in the armature and core.

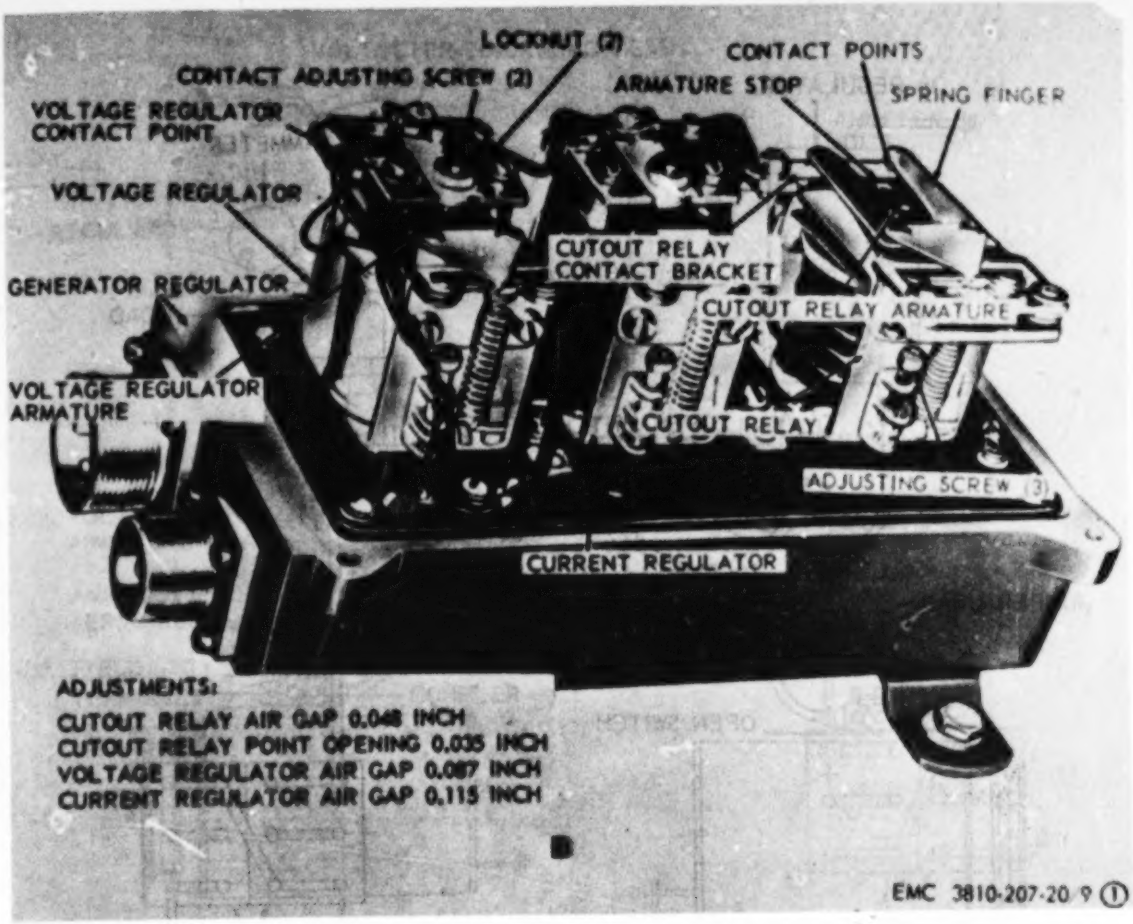

6. REMOVE SCREW.
MOUNTING PLATE
8. REMOVE COVER.
7. REMOVE NUT AND WASHER.
5. REMOVE SEAL CUP (2).
3. REMOVE NUT AND IET LOCKWASHER (4).
4. REMOVE REGULATOR.
1. DISCONNECT AMMETER LEAD.
2. DISCONNECT GENERATOR CABLE.
A
MSC 4310-221-15/27 ①

A—Generator regulator, removal

Figure 27. Generator regulator removal, installation, adjustment, and test wiring diagram.

(*d*) Should the cutout relay air gap not be as specified, move the lower contact bracket up or down to obtain the proper clearance.

Caution: Make certain the cutout relay contact bracket is in proper position to allow both contact points to close simultaneously.


LOCKNUT (2)
CONTACT ADJUSTING SCREW (2)
VOLTAGE REGULATOR CONTACT POINT
VOLTAGE REGULATOR
GENERATOR REGULATOR
VOLTAGE REGULATOR ARMATURE
CONTACT POINTS
ARMATURE STOP
SPRING FINGER
CUTOUT RELAY CONTACT BRACKET
CUTOUT RELAY ARMATURE
CUTOUT RELAY
ADJUSTING SCREW (3)
CURRENT REGULATOR
ADJUSTMENTS:
CUTOUT RELAY AIR GAP 0.048 INCH
CUTOUT RELAY POINT OPENING 0.035 INCH
VOLTAGE REGULATOR AIR GAP 0.087 INCH
CURRENT REGULATOR AIR GAP 0.115 INCH
B
EMC 3810-207-20 9 ①

B—Generator regulator adjustment points
Figure 27—Continued.

(*e*) Measure the clearance between the contact points. The proper cutout relay point opening is 0.035 inch.

(*f*) If the cutout relay point opening is not as specified, bend the upper armature stop until the specified air gap is obtained.

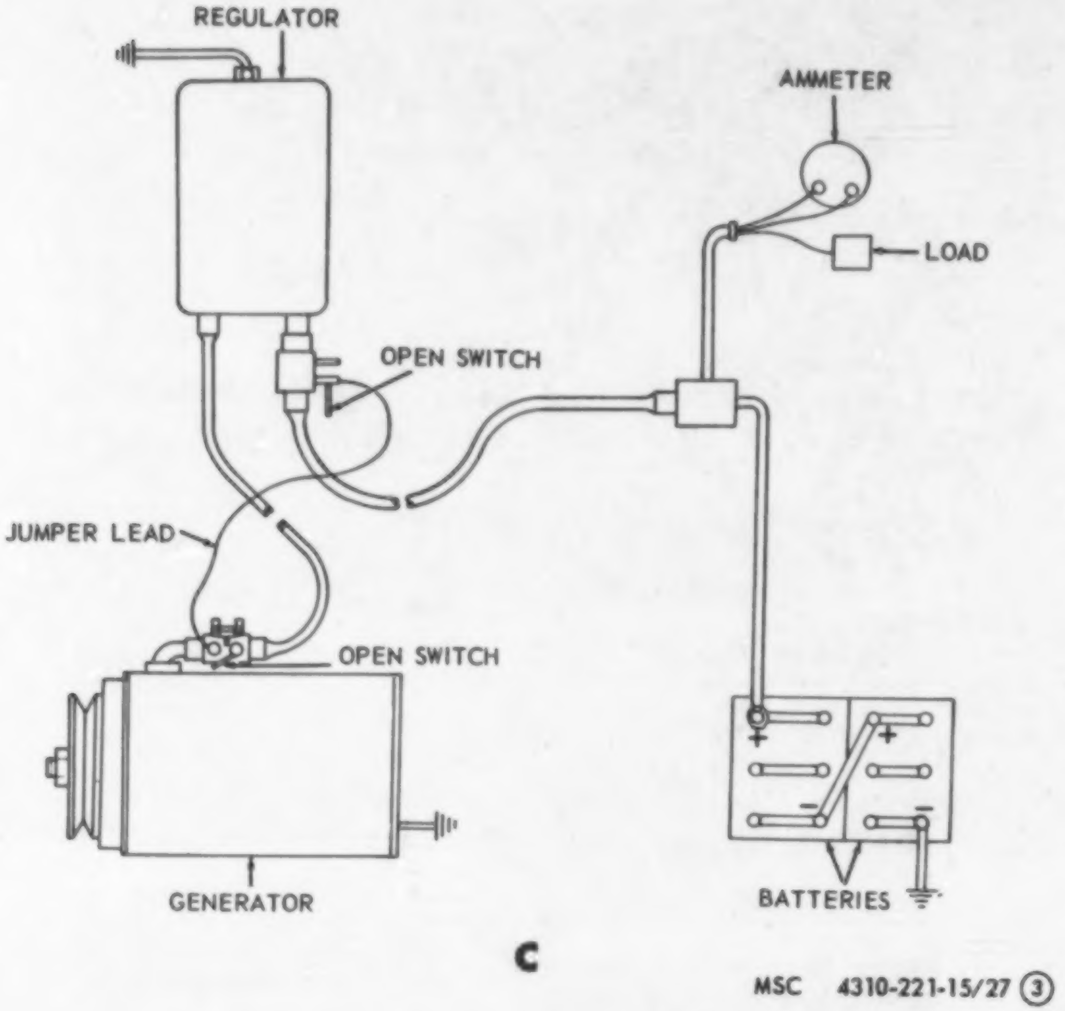
(*g*) Push down on the voltage regulator armature (B, fig. 27) until the voltage regulator contact point barely touches the adjusting screw. Measure the air gap between the coil core and the armature of the voltage regulator. Do not measure between the core residual brass pin and the armature. The correct voltage regulator air gap is 0.087 inch.

(*h*) Adjust the current regulator air gap to 0.115 inch in the same manner as for the voltage regulator unit described in (*d*) above.

(2) *Electrical adjustment.* Install set of test adapters as illustrated on figure 27.

Note. Refer to C, figure 27 and polarize the generator.

(*a*) *Cutout relay closing voltage.* With voltmeter connected as shown on D, figure 27, start the engine and slowly increase speed until the cutout relay contact points close. Observe voltage readings at which this occurs. It should be 25 to 27 volts. If adjustment is necessary, turn cutout relay adjusting screw clockwise

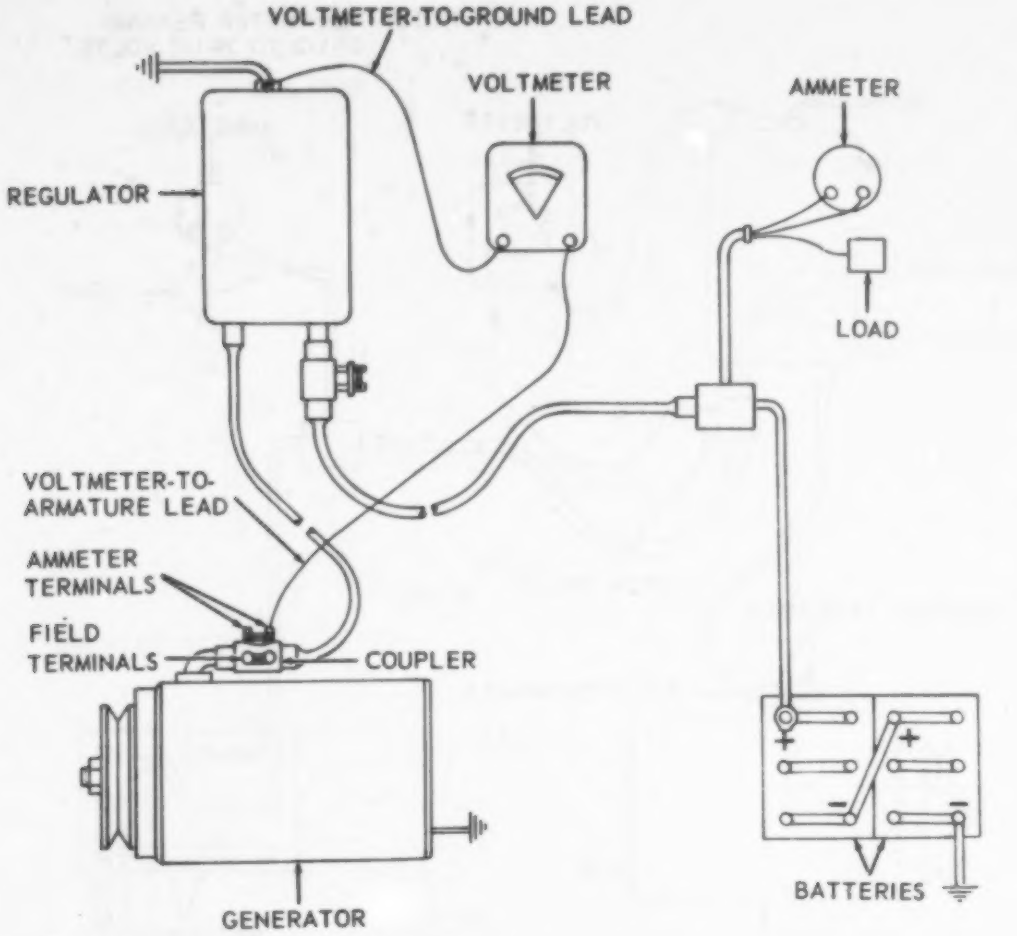

REGULATOR
AMMETER
LOAD
OPEN SWITCH
JUMPER LEAD
OPEN SWITCH
GENERATOR
BATTERIES
+
+
−
−
C
MSC 4310-221-15/27 ③

C—Electrical connections for polarizing generator
Figure 27—Continued.

to increase or counterclockwise to decrease the closing voltage. Set closing voltage at 26 volts.

(*b*) *Voltage regulator opening voltage.* With voltmeter connected as shown on E, figure 27, increase rpm to operating speed. Observe reading on voltmeter. It should read 27.5 to 29.5 volts. If adjustment is necessary, turn the voltage regulator adjusting screw clockwise to increase and counterclockwise to decrease. Set voltage at 28.2 volts.

(*c*) *Current regulator maximum amperage.* With ammeter connected as shown in F, figure 27 and either the test set carbon pile load set up at 25 to 30 amp, or first having operated the starter for 10 to 15 seconds to provide the load, increase rpm to operating speed, observe reading on ammeter at which points


VOLTMETER-TO-GROUND LEAD
VOLTMETER
AMMETER
REGULATOR
LOAD
VOLTMETER-TO-ARMATURE LEAD
AMMETER TERMINALS
FIELD TERMINALS
COUPLER
+
+
−
−
BATTERIES
GENERATOR

STEP 1. CONNECT THE VOLTMETER TO THE GENERATOR ARMATURE AND GROUND.

STEP 2. START THE ENGINE.

STEP 3. THE VOLTMETER SHOULD INDICATE BETWEEN 25 AND 27 VOLTS.

STEP 4. STOP THE ENGINE AND REMOVE THE VOLTMETER AND LEADS.

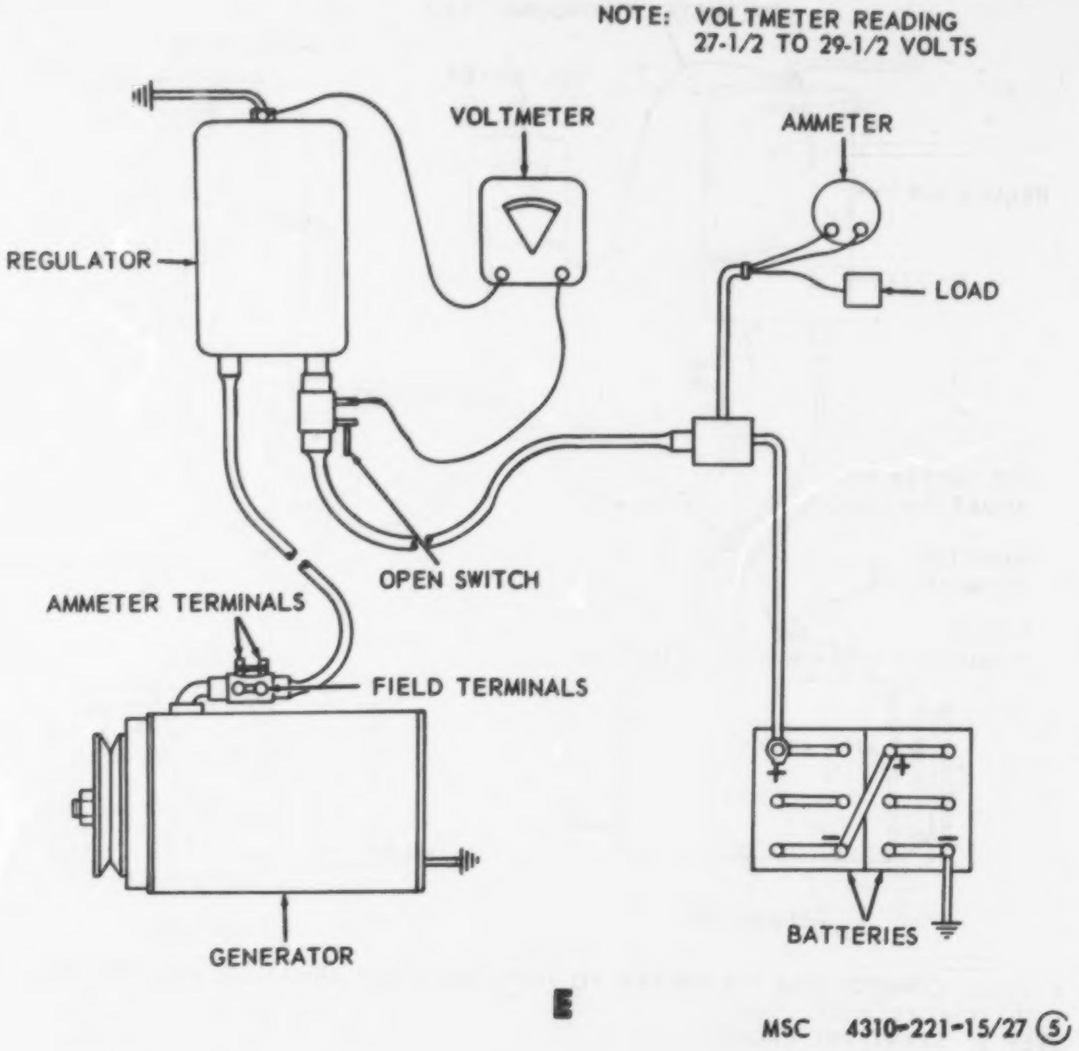
D

MSC 4310-221-15/27 ④

D—Electrical connections for testing cutout relay and generator
Figure 27—Continued.

first vibrate. This should be 38 to 42 amperes. If adjustment is necessary, adjust the current regulator to 40 amperes in the same manner as the voltage regulator.

(*d*) Replace generator regulator cover and repeat all tests before removing adapters. Run regulator voltage and amperage output through several cycles of increasing and de-


NOTE: VOLTMETER READING 27-1/2 TO 29-1/2 VOLTS
VOLTMETER
AMMETER
REGULATOR
LOAD
OPEN SWITCH
AMMETER TERMINALS
FIELD TERMINALS
GENERATOR
BATTERIES
+
+
−
−
E
MSC 4310-221-15/27 ⑤

E—Electrical connections for testing voltage regulator
Figure 27—Continued.

creasing engine speed from idle-to-operating-to-idle speed to make sure adjustments are stable.

(*e*) Remove adapters and connect cables.

69. Slave Receptacle

a. Removal. Remove the slave receptacle as instructed on figure 28.

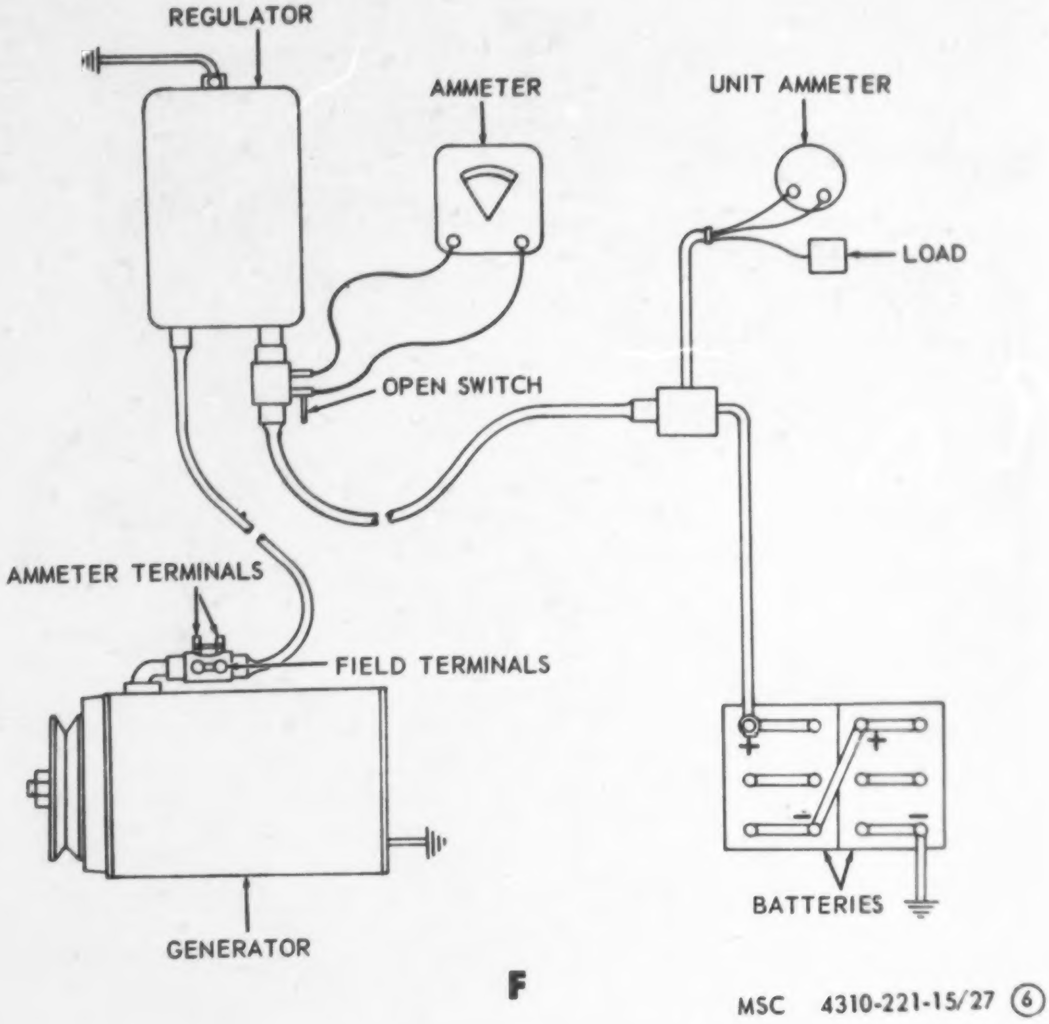
b. Cleaning, Inspection, and Repair.

(1) Clean the slave receptacle with a cloth dampened in approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, corrosion, and damaged terminals. Replace a defective slave receptacle.

(3) Replace or repair all damaged cables.

c. Installation. Install the slave receptacle in reverse of the instructions on figure 28.


REGULATOR
AMMETER
UNIT AMMETER
LOAD
OPEN SWITCH
AMMETER TERMINALS
FIELD TERMINALS
+
+
-
-
BATTERIES
GENERATOR
F
MSC 4310-221-15/27 ⑥

F—Electrical connections for testing current regulator
Figure 27—Continued.

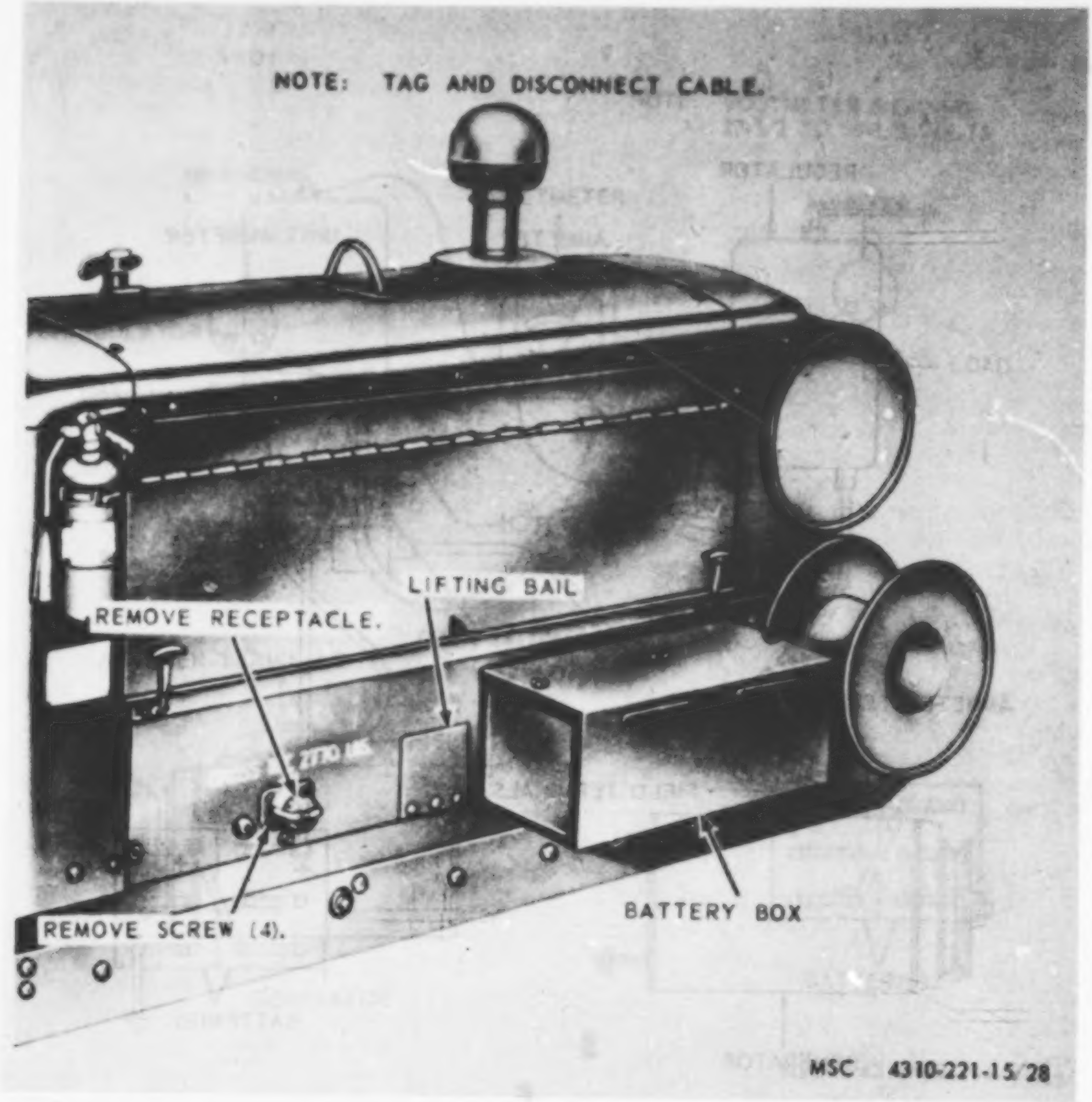

NOTE: TAG AND DISCONNECT CABLE.
LIFTING BAIL
REMOVE RECEPTACLE.
BATTERY BOX
REMOVE SCREW (4).
MSC 4310-221-15/28

Figure 28. Slave receptacle, removal and installation.

Section X. IGNITION SYSTEM

70. General

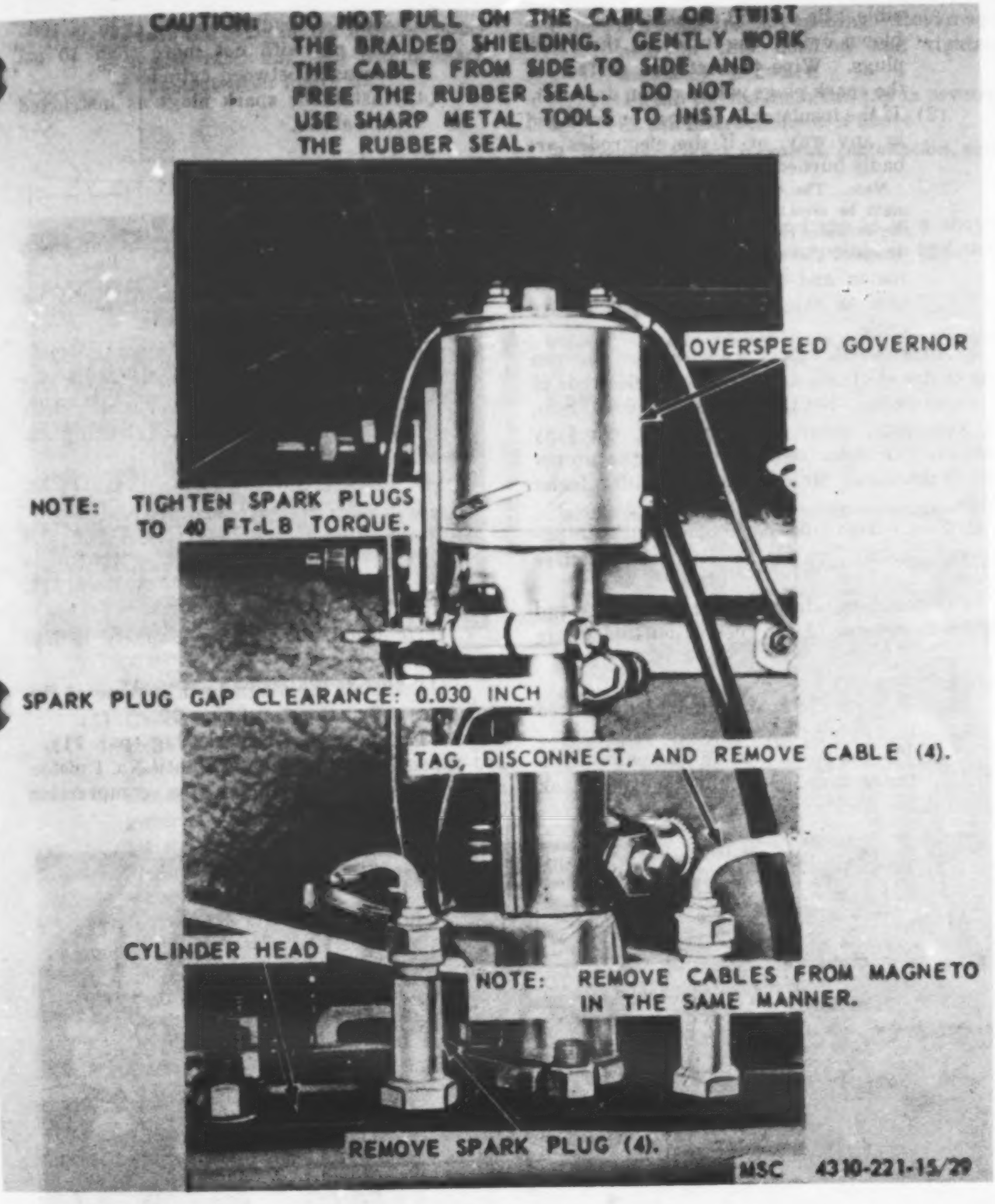
The ignition system consists of a magneto, driven by an impulse coupling, mounted on the timing gearcase. Its function is to provide high tension current to the spark plugs which fire the fuel-air mixture in the combustion chambers. To stop the engine, an ignition switch is provided to ground the primary winding of the magneto coil, thereby stopping the flow of current to the spark plugs.

71. Spark Plugs and Cables

a. Removal.

(1) Remove all dirt and foreign matter from the cylinder head around the spark plug openings.

(2) Remove the cables and spark plugs as instructed on figure 29.



CAUTION: DO NOT PULL ON THE CABLE OR TWIST THE BRAIDED SHIELDING. GENTLY WORK THE CABLE FROM SIDE TO SIDE AND FREE THE RUBBER SEAL. DO NOT USE SHARP METAL TOOLS TO INSTALL THE RUBBER SEAL.

OVERSPEED GOVERNOR

NOTE: TIGHTEN SPARK PLUGS TO 40 FT-LB TORQUE.

SPARK PLUG GAP CLEARANCE: 0.030 INCH

TAG, DISCONNECT, AND REMOVE CABLE (4).

CYLINDER HEAD

NOTE: REMOVE CABLES FROM MAGNETO IN THE SAME MANNER.

REMOVE SPARK PLUG (4).

MSC 4310-221-15/29

Figure 29. Spark plugs and cables, removal and installation.

b. Cleaning and Inspection.

(1) Clean the spark plugs with a conventional air-blast type spark plug cleaner. If cleaner is not available, scrape as much of the carbon deposits from the electrodes and insulators as pos-

sible. Be sure all abrasive material is blown out of the inside of the spark plugs. Wipe the exterior surface of the spark plugs with a clean, dry cloth.

(2) If the insulator is chipped or damaged in any way, or if the electrodes are badly burned, replace the spark plugs.

Note. The outside or grounded electrode must be directly alined with the inside of the insulated electrode.

(3) Inspect the spark plug cables for corrosion and frayed or broken insulation or shielding. Replace defective cable.

c. Adjustment. Place a feeler gage between the center electrode and the ground electrode of the spark plug. Set the clearance at 0.030 inch. If necessary, regap the electrodes, carefully bending the outer electrodes until the proper gap is obtained. Recheck the gap with a feeler gage.

d. Test. Test the spark plugs with an approved testing machine. Replace defective plugs.

e. Installation. Install the spark plugs and cables in reverse of the instructions on figure 29.

f. Compression Test.

(1) Remove the spark plugs as instructed in *a* above.

(2) Place a suitable cylinder compression tester in the spark plug hole and crank the engine with the starter.

(3) Normal reading on the gage is 100–105 psi with not more than 10 psi variance between cylinders.

(4) Install the spark plugs as instructed in *e* above.

72. Magneto

a. Removal.

(1) Remove the cables from magneto (par. 71).

(2) Remove the magneto as instructed on figure 30.

b. Cleaning and Inspection.

(1) Clean the exterior of the magneto and the face of the gear cover with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Inspect the magneto for cracks, breaks, or other damage. Check the surface of the mounting flange and surface on which the magneto is mounted to be sure that it is flat, smooth and free of burrs.

c. Installation and Timing Magneto to Engine.

(1) Install the magneto in reverse of the instructions on figure 30.

(2) Remove No. 1 spark plug (par. 71).

(3) Slowly crank engine until No. 1 piston is coming up on the compression stroke.

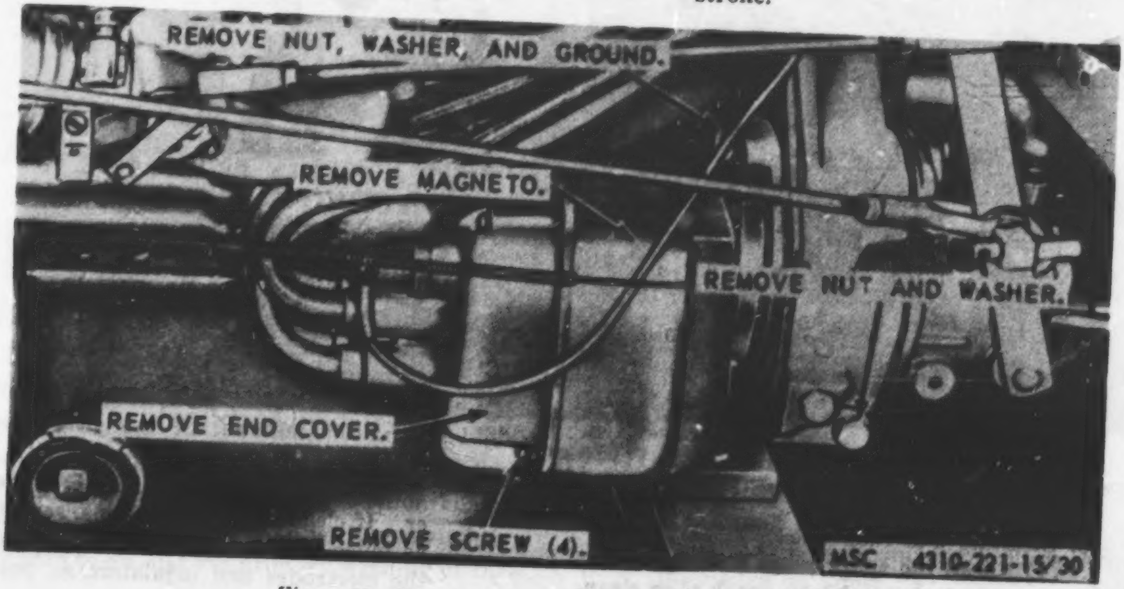


Figure 30. Magneto and end cap, removal and installation.

(4) Loosen the cover on the flywheel housing and watch for (dc) timing mark as illustrated on figure 31.

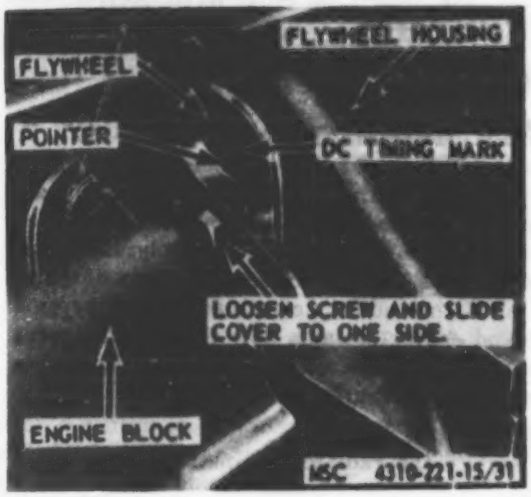

FLYWHEEL HOUSING
FLYWHEEL
POINTER
DC TIMING MARK
LOOSEN SCREW AND SLIDE COVER TO ONE SIDE.
ENGINE BLOCK
MSC 4310-221-15/31

Figure 31. Flywheel timing mark.

(5) Check the timing of the governor gear to the camshaft gear. If the governor gear is properly timed to the camshaft gear, the driving slot in the governor gear will be almost horizontal when timing marks are alined.

(6) Remove the magneto end cap as instructed in *a* above.

(7) Turn the magneto rotor in reverse direction until the electrode is in the correct position for firing No. 1 cylinder.

(8) Position the magneto on the gear cover in reverse of the instructions on figure 30.

Note. Make sure the magneto coupling engages the governor gear slot. Do not tighten any hardware.

(9) Connect one cable of a low-voltage, self-powered test lamp to the stationary point assembly and the other end to the metal part of the breaker arm assembly.

(10) Rotate the magneto assembly towards or away from the engine block until the test lamp indicates that the breaker points are just opening. Hold magneto in this position and tighten mounting hardware.

(11) Install the magneto end cap in reverse of the instructions in *a* above.

d. Breaker Points Removal, Installation, and Adjustment.

(1) *Removal.*

(*a*) Remove the end cap as in *a* above.

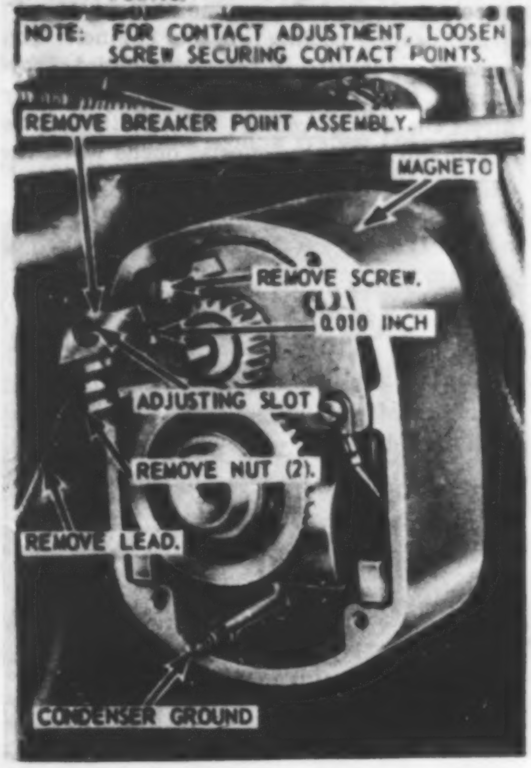
(*b*) Remove breaker points as instructed on figure 32.

ADJUSTMENT:

STEP 1. CRANK ENGINE UNTIL CONTACT POINTS ARE FULLY OPEN.

STEP 2. LOOSEN SCREW.

STEP 3. TURN ADJUSTING SLOT COUNTERCLOCKWISE TO INCREASE OR CLOCKWISE TO DECREASE CLEARANCE OF CONTACT POINTS.


NOTE: FOR CONTACT ADJUSTMENT, LOOSEN SCREW SECURING CONTACT POINTS.

REMOVE BREAKER POINT ASSEMBLY.
MAGNETO
REMOVE SCREW.
(1)
0.010 INCH
ADJUSTING SLOT
REMOVE NUT (2).
REMOVE LEAD.
CONDENSER GROUND

STEP 4. INSERT 0.010 INCH FEELER GAGE BETWEEN THE CONTACT POINTS. THERE SHOULD BE A SLIGHT DRAG ON THE FEELER GAGE.

STEP 5. TIGHTEN SCREW.

Figure 32. Breaker points, removal, installation, and adjustment.

(2) *Cleaning and Inspection.*

(*a*) Wipe breaker points with a clean, lint-free cloth.

(*b*) Inspect the breaker points for cracks, pits, burned contacts, and other damage. Replace defective breaker points.

(3) *Installation.*

(*a*) Install the breaker points in reverse of the instructions on figure 32.

(*b*) Install the end cap in reverse of *a* above.

(4) ***Breaker point adjustment.***

(*a*) Remove the end cap as instructed in *a* above.

(*b*) Adjust the breaker points as instructed on figure 32.

(*c*) Install the end cap in reverse of *a* above.

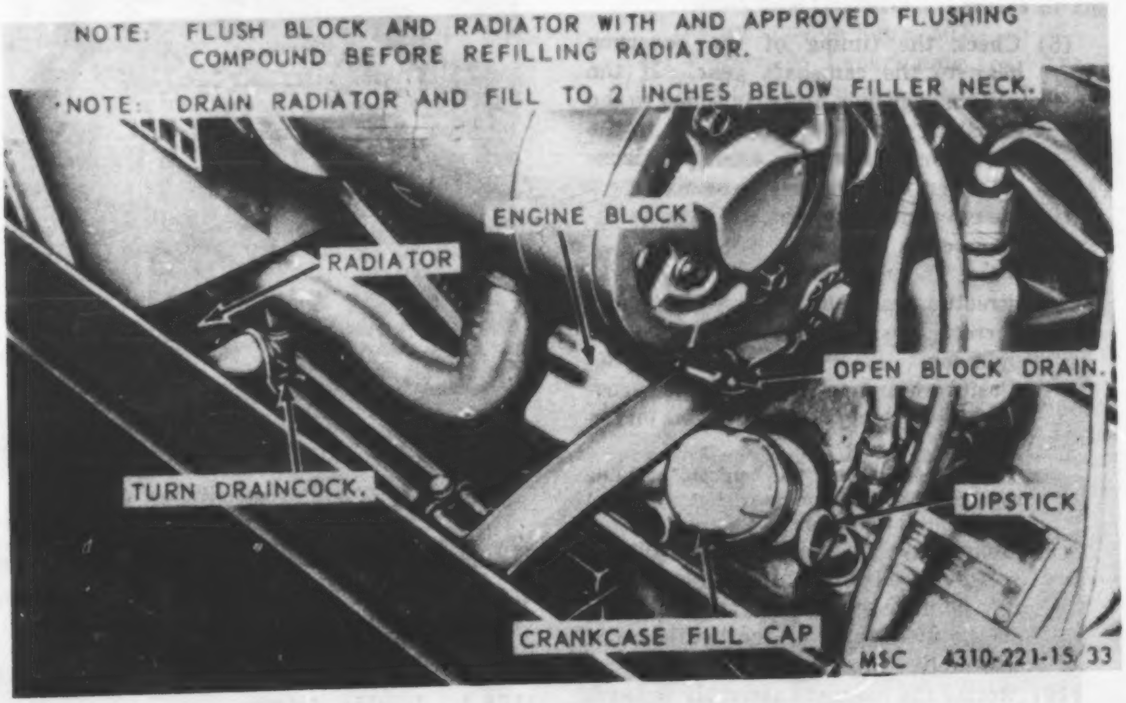
Section XI. COOLING SYSTEM

73. General

The cooling system consists of a radiator, fan, water pump, thermostat, and necessary hoses to connect the components of the system. The 4-bladed fan provides circulation of air around the engine and through the radiator cooling passages. The water pump circulates the coolant through the engine and radiator to provide proper cooling of the engine. The thermostat is located in the water outlet elbow on top of the cylinder head. It automatically controls the flow of coolant through the engine and radiator. The thermostat opens when the coolant temperature reaches 160°—180° F. The oil cooler and radiator assembly is mounted on the front of the compressor frame. The assembly consists of two separate heat transfer core sections having approximately the same frontal area. The oil cooler core is mounted in front of the radiator core. As the compressor oil and engine coolants flow through the cores they are cooled by air drawn through the cores by the engine fan.

74. Radiator Service

Service the radiator as instructed on figure 33.



NOTE: FLUSH BLOCK AND RADIATOR WITH AND APPROVED FLUSHING COMPOUND BEFORE REFILLING RADIATOR.

NOTE: DRAIN RADIATOR AND FILL TO 2 INCHES BELOW FILLER NECK.

Figure 33. Radiator and block service.

75. Radiator Hoses, Lines, Thermostat Housing, and Thermostat

a. Removal.

(1) Drain radiator (par. 74).

(2) Remove radiator hoses, lines, thermostat housing, and thermostat as instructed on figure 34.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent.

(2) Inspect all tubing and lines for cracks or breaks, and hoses for deterioration. Replace all unserviceable parts as necessary.

(3) Inspect the thermostat housing and thermostat for cracks, breaks, and other damage. Inspect thermostat and gasket for good condition. Replace defective parts as necessary.

c. Test. Test the thermostat by submerging it in a container of water that can be heated and checked with an accurate thermometer. It should start to open at 160° F. and should be completely opened at 180° F. Replace a defective thermostat.

d. Installation.

(1) Install the thermostat, thermostat housing, radiator lines and hoses in reverse of the instructions on figure 34.

(2) Fill radiator (par. 74).

76. Fan Guard and Shroud

a. Removal. Remove the fan guard and shroud as instructed on figure 35.

b. Cleaning and Inspection.

(1) Clean fan guard and shroud with an approved cleaning solvent.

(2) Inspect guard and shroud for cracks, breaks, and bends. Replace defective guard and shroud as necessary.

c. Installation. Install the fan guard and shroud in reverse of the instructions on figure 35.

77. Fan

a. Removal.

(1) Remove the fan guard from shroud (par. 76).

(2) Remove fan as instructed on figure 36.

b. Cleaning and Inspection.

(1) Clean the fan with an approved cleaning solvent.

(2) Inspect the blades for cracks, broken or missing rivets, and bent or twisted condition. Replace the fan if it is unserviceable.

c. Installation.

(1) Install the fan in reverse of the instructions on figure 36.

(2) Install the fan shroud and guard on the radiator (par. 76).

78. Water Pump

a. Removal.

(1) Drain the cooling system (par. 74).

(2) Remove the fan belt (par. 67).

(3) Remove fan (par. 77).

(4) Disconnect water inlet hose (par. 74).

(5) Remove the water pump as instructed on figure 37.

b. Cleaning and Inspection.

(1) Wash the water pump in an approved cleaning solvent and dry thoroughly.

(2) Inspect the water pump and circulating tube for cracks, breaks, dents, and signs of leaking. Replace a defective tube or water pump.

c. Installation.

(1) Install the water pump in reverse of the instructions on figure 37.

(2) Correct the water inlet hose (par. 74).

(3) Install the fan (par. 77).

(4) Install the fan belt (par. 67).

(5) Fill the cooling system (par. 74).

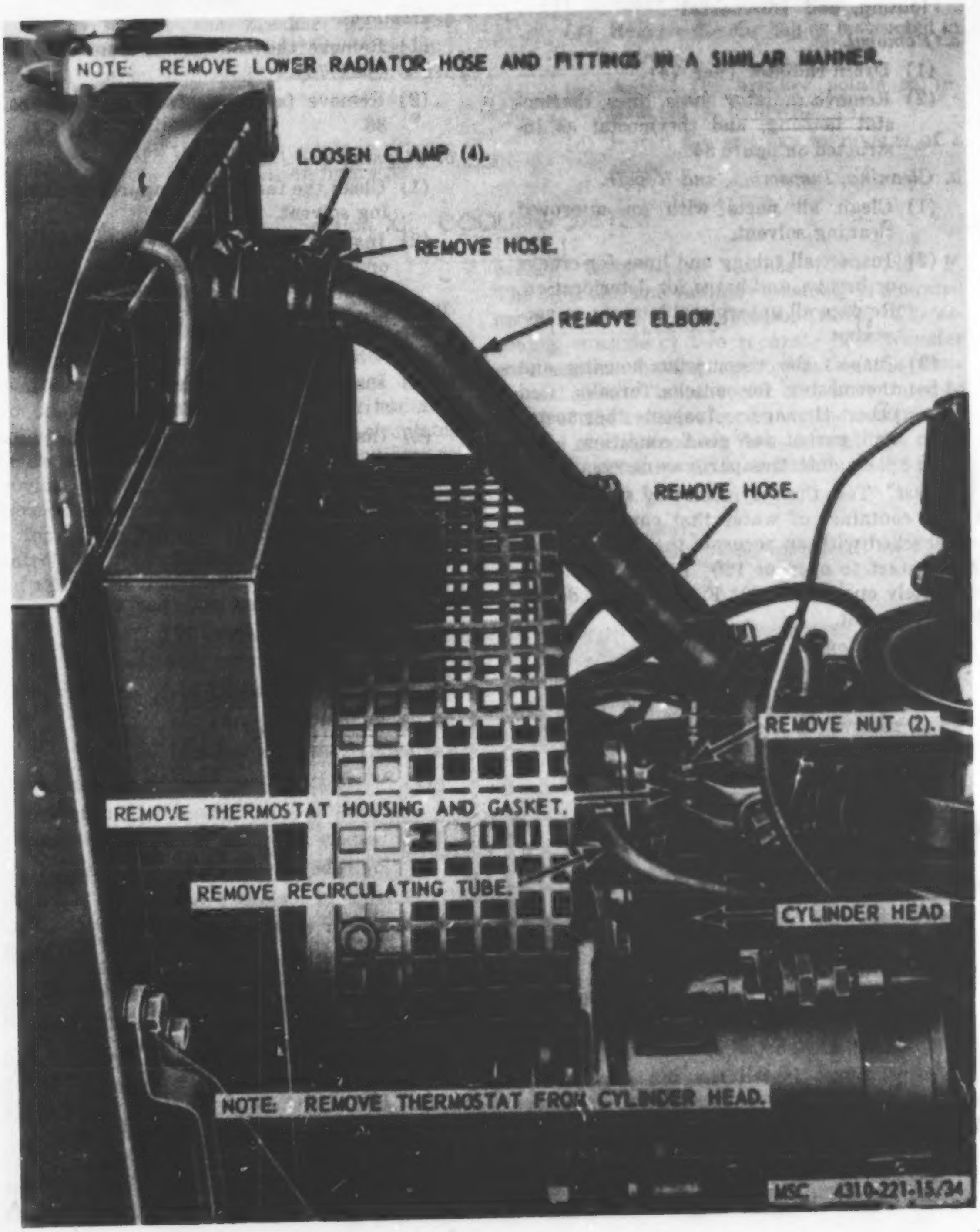

NOTE: REMOVE LOWER RADIATOR HOSE AND FITTINGS IN A SIMILAR MANNER.
LOOSEN CLAMP (4).
REMOVE HOSE.
REMOVE ELBOW.
REMOVE HOSE.
REMOVE NUT (2).
REMOVE THERMOSTAT HOUSING AND GASKET.
REMOVE RECIRCULATING TUBE.
CYLINDER HEAD
NOTE: REMOVE THERMOSTAT FROM CYLINDER HEAD.
MSC 4310-221-15/34

Figure 34. Radiator hoses, lines, thermostat housing, and thermostat, removal and installation.

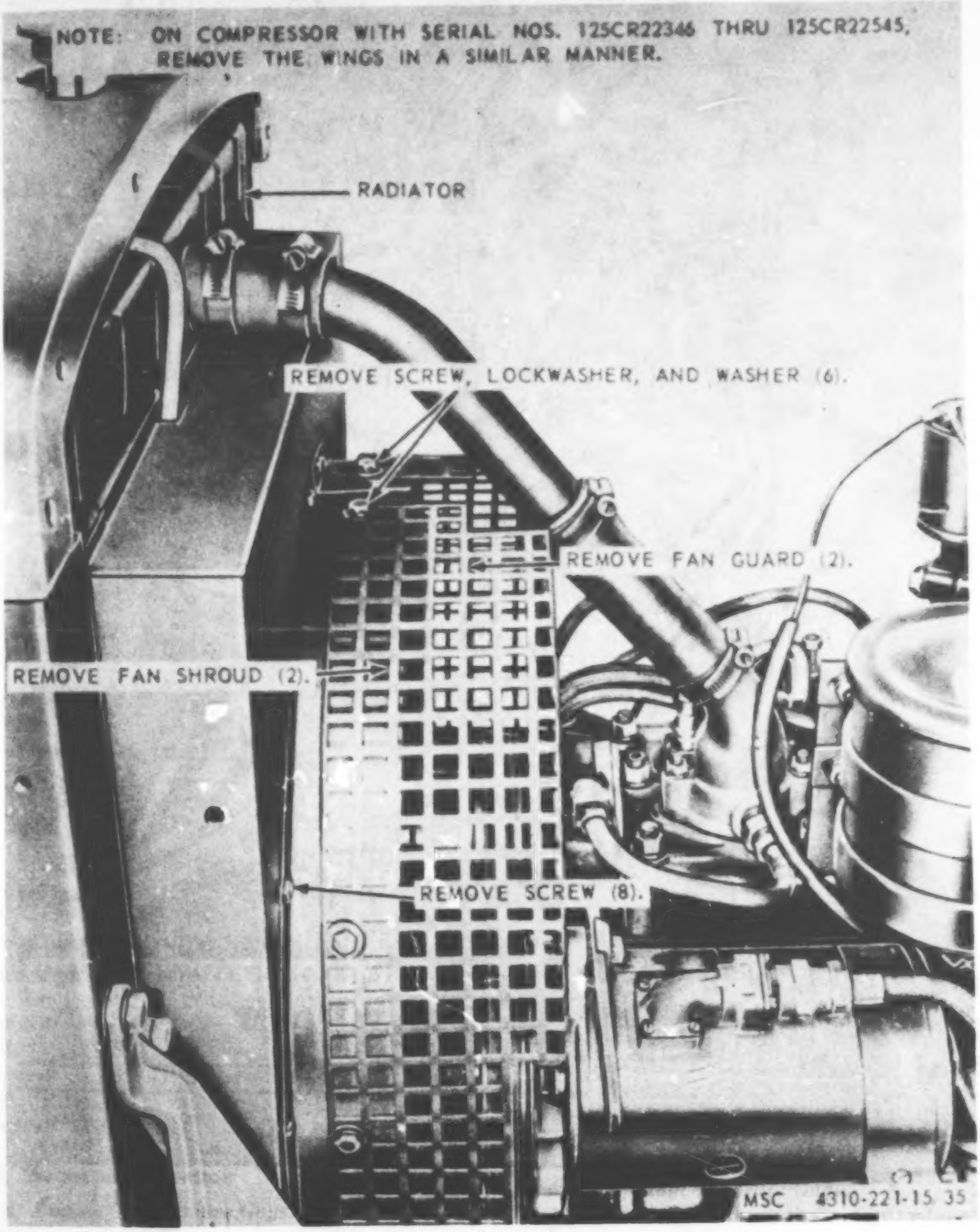
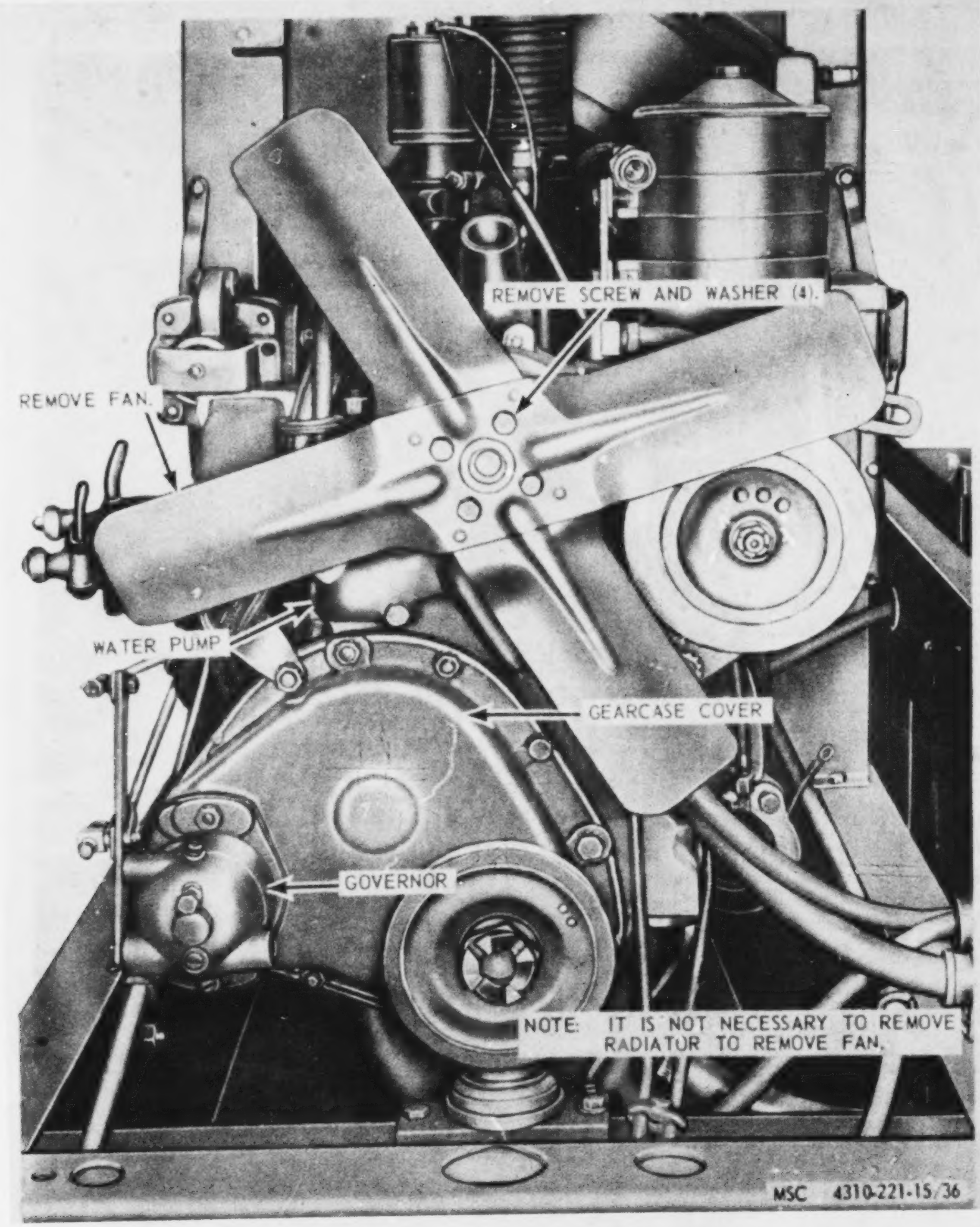

NOTE: ON COMPRESSOR WITH SERIAL NOS. 125CR22346 THRU 125CR22545, REMOVE THE WINGS IN A SIMILAR MANNER.
RADIATOR
REMOVE SCREW, LOCKWASHER, AND WASHER (6).
REMOVE FAN GUARD (2).
REMOVE FAN SHROUD (2).
REMOVE SCREW (8).
MSC 4310-221-15 35

Figure 35. Fan guard and shroud, removal and installation.


REMOVE SCREW AND WASHER (4).
REMOVE FAN.
WATER PUMP
GEARCASE COVER
GOVERNOR
NOTE: IT IS NOT NECESSARY TO REMOVE RADIATOR TO REMOVE FAN.
MSC 4310-221-15/36

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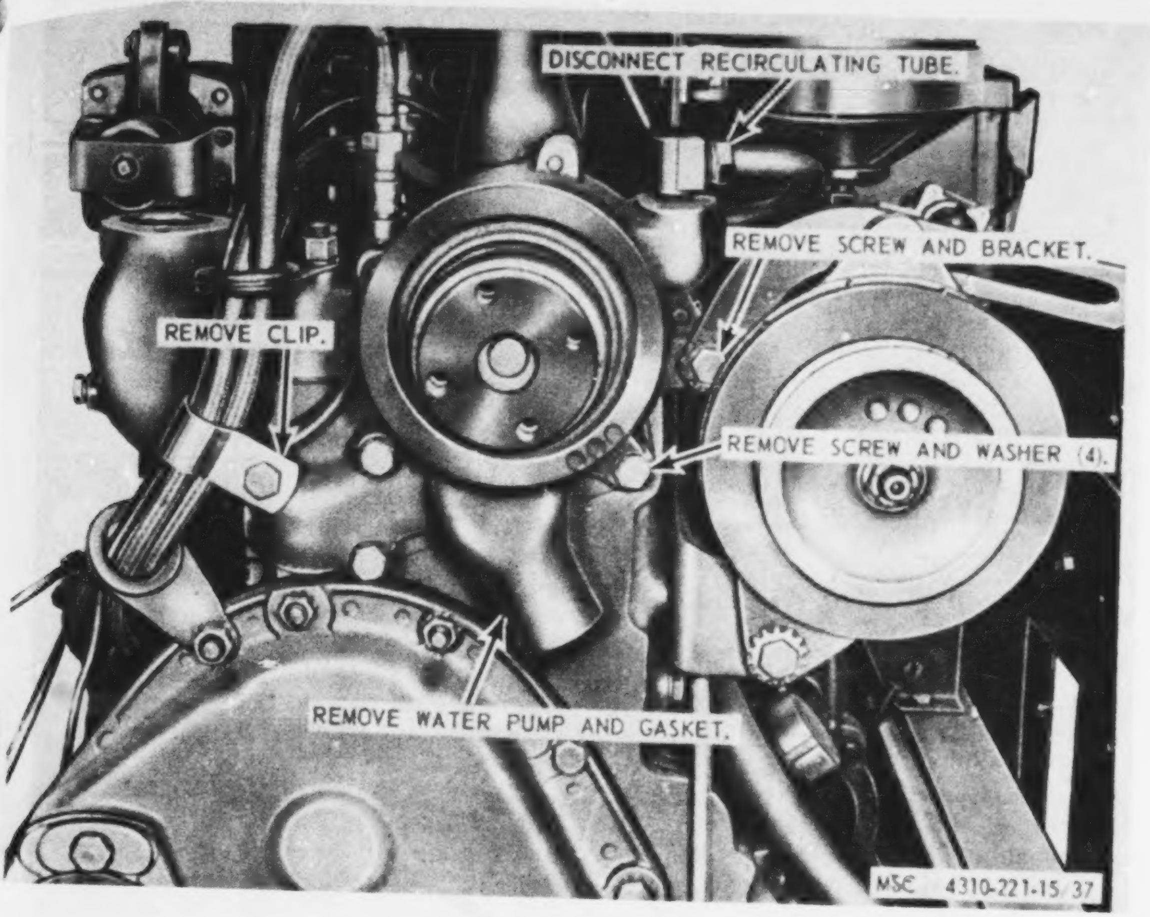
DISCONNECT RECIRCULATING TUBE.
REMOVE SCREW AND BRACKET.
REMOVE CLIP.
REMOVE SCREW AND WASHER (4).
REMOVE WATER PUMP AND GASKET.
MSC 4310-221-15/37

Figure 37 Water pump, removal and installation.

Section XII. ENGINE AND COMPRESSOR INSTRUMENT AND CONTROL PANEL

79. General

The engine and compressor instrument and control panel is located on the left, rear side of the compressor. It contains the gages used to indicate engine and compressor operating conditions and houses the engine starting controls. For proper removal and installation of all electrical wiring on the compressor, refer to wiring diagram (fig. 3).

80. Gages and Controls

a. Engine Oil Pressure Gage.

(1) *Removal.* Remove the engine oil pressure gage as instructed on figure 38.

(2) *Cleaning and Inspection.*

(*a*) Clean the oil pressure gage with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect oil pressure gage for proper operation, broken glass, and broken or damaged terminals and wires. Replace a defective gage.

(3) *Installation.* Install the engine oil pressure gage in reverse of the instructions on figure 38.

b. Air Interstage Pressure Gage.

(1) *Removal.* Remove the air interstage pressure gage as instructed on figure 38.

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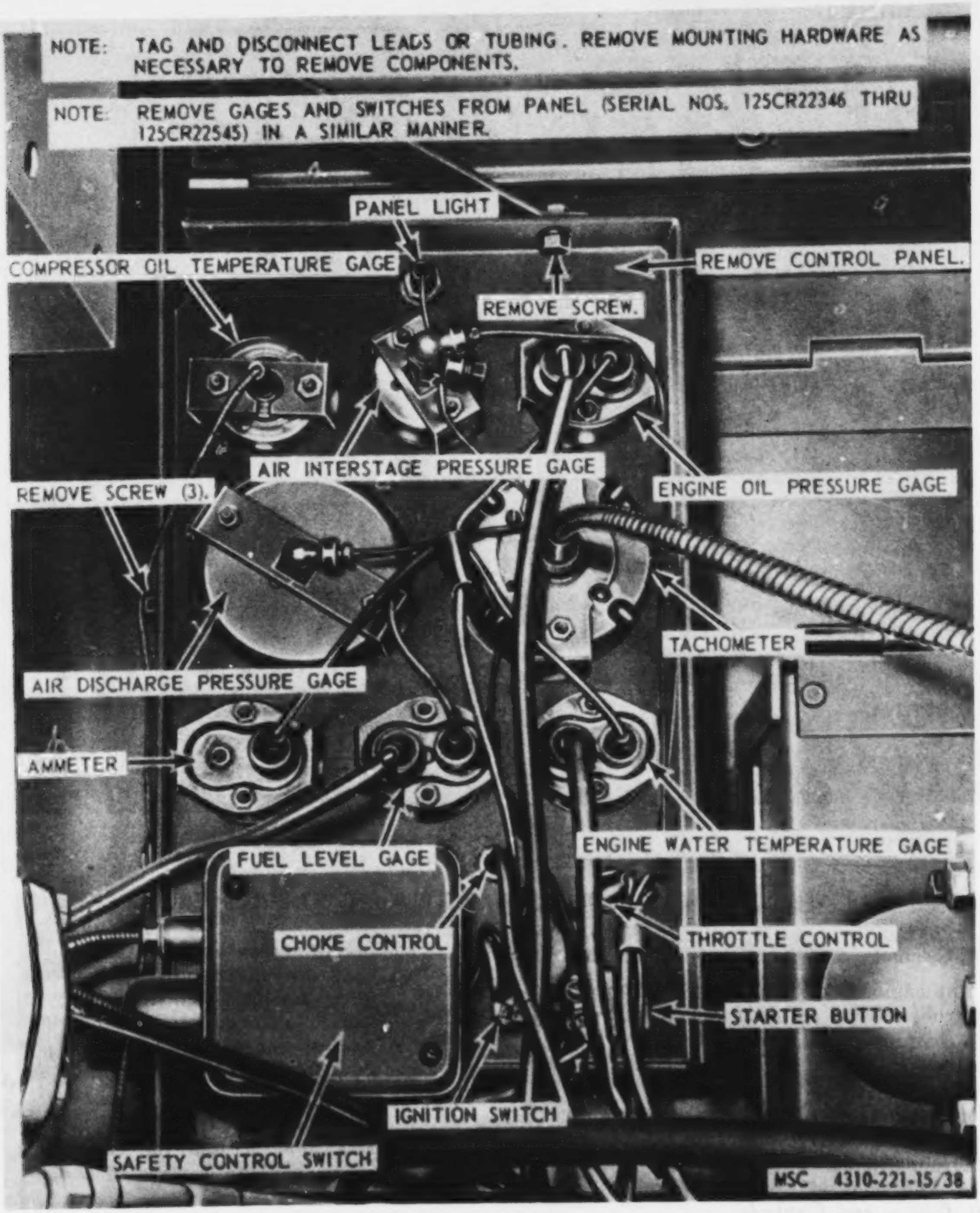

NOTE: TAG AND DISCONNECT LEADS OR TUBING. REMOVE MOUNTING HARDWARE AS NECESSARY TO REMOVE COMPONENTS.
NOTE: REMOVE GAGES AND SWITCHES FROM PANEL (SERIAL NOS. 125CR22346 THRU 125CR22545) IN A SIMILAR MANNER.
PANEL LIGHT
COMPRESSOR OIL TEMPERATURE GAGE
REMOVE CONTROL PANEL.
REMOVE SCREW.
AIR INTERSTAGE PRESSURE GAGE
ENGINE OIL PRESSURE GAGE
REMOVE SCREW (3).
TACHOMETER
AIR DISCHARGE PRESSURE GAGE
AMMETER
ENGINE WATER TEMPERATURE GAGE
FUEL LEVEL GAGE
CHOKE CONTROL
THROTTLE CONTROL
STARTER BUTTON
IGNITION SWITCH
SAFETY CONTROL SWITCH
MSC 4310-221-15/38

Figure 38. Instrument panel, gages, switches, and wiring, removal and installation, (serial Nos. 125CR24901 through 125CR25400).

(2) *Cleaning and Inspection.*

(*a*) Clean the air interstage pressure gage with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect gage for proper operation, broken glass, and broken or damaged terminals and wires. Replace a defective gage.

(3) *Installation.* Install the air interstage pressure gage in reverse of the instructions on figure 38.

c. Compressor Oil Temperature Gage.

(1) *Removal.* Remove the compressor oil temperature gage as instructed on figure 38 and in paragraph 81.

(2) *Cleaning and Inspection.*

(*a*) Clean the gage with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the gage for proper operation, broken glass, and broken or damaged terminals and wires. Replace a defective gage.

(3) *Installation.* Install the compressor oil temperature gage in reverse of the instructions on figure 38 and in paragraph 81.

d. Air Discharge Pressure Gage.

(1) *Removal.* Remove the air discharge pressure gage as instructed on figure 38.

(2) *Cleaning and Inspection.*

(*a*) Clean the gage with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the gage for proper operation, broken glass, and broken or damaged terminals and wires. Replace a defective gage.

(3) *Installation.* Install the air discharge pressure gage in reverse of the instructions on figure 38.

e. Engine Water Temperature Gage.

(1) *Removal.* Remove the engine water temperature gage as instructed on figures 38 and 39.

(2) *Cleaning and Inspection.*

(a) Clean the gage with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the gage for proper operation, broken glass, and broken or damaged terminals or wires. Replace a defective gage.

(3) *Installation.* Install the engine water temperature gage in reverse of the instructions on figures 38 and 39.

f. Tachometer.

(1) *Removal.* Remove the tachometer as instructed on figure 38.

(2) *Cleaning and Inspection.*

(*a*) Clean the tachometer with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the tachometer for proper operation, broken glass, and broken or damaged cable or adapter. Replace a defective tachometer.

(3) *Installation.* Install the tachometer in reverse of the instructions on figure 38.

g. Ammeter.

(1) *Removal.* Remove the ammeter as instructed on figure 38.

(2) *Cleaning and Inspection.*

(*a*) Clean the ammeter with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the ammeter for proper operation, broken glass, and broken or damaged terminals or wires. Replace a defective gage.

(3) *Installation.* Install the ammeter in reverse of the instructions on figure 38.

h. Choke Control.

(1) *Removal.* Remove the choke control as instructed on figure 38 and in paragraph 59.

(2) *Cleaning and Inspection.*

(*a*) Clean the choke control and cable with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the choke control and cable for evidence of cracks, broken cables, and worn condition. Replace a defective choke control and cable.

(3) *Installation.* Install the choke control in reverse of the instructions on figure 38 and in paragraph 59.

i. Ignition Switch.

(1) *Removal.* Remove the ignition switch as instructed on figure 38.

(2) *Cleaning and Inspection.*

(*a*) Clean the ignition switch with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the ignition switch for positive action. Use a test lamp to check for continuity of contacts. Replace defective ignition switch.

(3) *Installation.* Install the ignition switch in reverse of the instructions on figure 38.

j. Starter Button.

(1) *Removal.* Remove the starter button as instructed on figure 38.

(2) *Cleaning and Inspection.*

(*a*) Clean the starter button with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the button for positive action. Use a test lamp to check for continuity of contacts. Replace a defective starter button.

(3) *Installation.* Install the starter button in reverse of the instructions on figure 38.

k. Throttle Control.

(1) *Removal.* Remove the throttle control as instructed on figure 38 and in paragraph 59.

(2) *Cleaning and Inspection.*

(*a*) Clean the throttle control and cable with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the throttle control for evidence of cracks, broken cable, or worn condition. Replace a defective throttle control.

(3) *Installation.* Install the throttle control in reverse of the instructions on figure 38 and in paragraph 59.

l. Fuel Level Gage (Serial Nos. 125CR24901 through 125CR25400).

(1) *Removal.* Remove the fuel level gage as instructed on figure 38.

(2) *Cleaning and Inspection.*

(*a*) Clean the fuel level gage with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the gage for proper operation, broken glass, or broken or damaged terminals or wires. Replace a defective gage.

(3) *Installation.* Install the fuel level gage in reverse of the instructions on figure 38.

m. Instrument Panel Light (Serial Nos. 125CR24901 through 125CR25400).

(1) *Removal.* Remove the panel light as instructed on figure 38.

(2) *Cleaning and Inspection.*

(*a*) Clean the panel light with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect panel light for dents, broken bulb, and damaged switch. Inspect wire leads for damaged or burned connector and insulation. Replace defective panel light, wire lead, or broken or burned out bulb.

(3) *Installation.* Install the panel light in reverse of the instructions on figure 38.

n. Engine Safety Control (Serial Nos. 125CR24901 through 125CR25400).

(1) *Removal.*

(*a*) Remove the element and capillary tube from cylinder head as instructed on figure 39.

(*b*) Remove the safety control as instructed on figure 38.

(2) *Cleaning and Inspection.*

(*a*) Clean the capillary tube and safety control with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the safety control for damaged case, and inspect capillary tube and element for kinks, breaks, or evidence of leaking. Replace defective parts as necessary.

(3) *Installation.*

(*a*) Install the safety control in reverse of the instructions on figure 38.

(*b*) Install the element and capillary tube to the cylinder head in reverse of the instructions on figure 39.

o. Compressor Air Receiver—Oil Separator Level Gage.

(1) *Removal.*

(*a*) Drain compressor lubrication system (fig. 8).

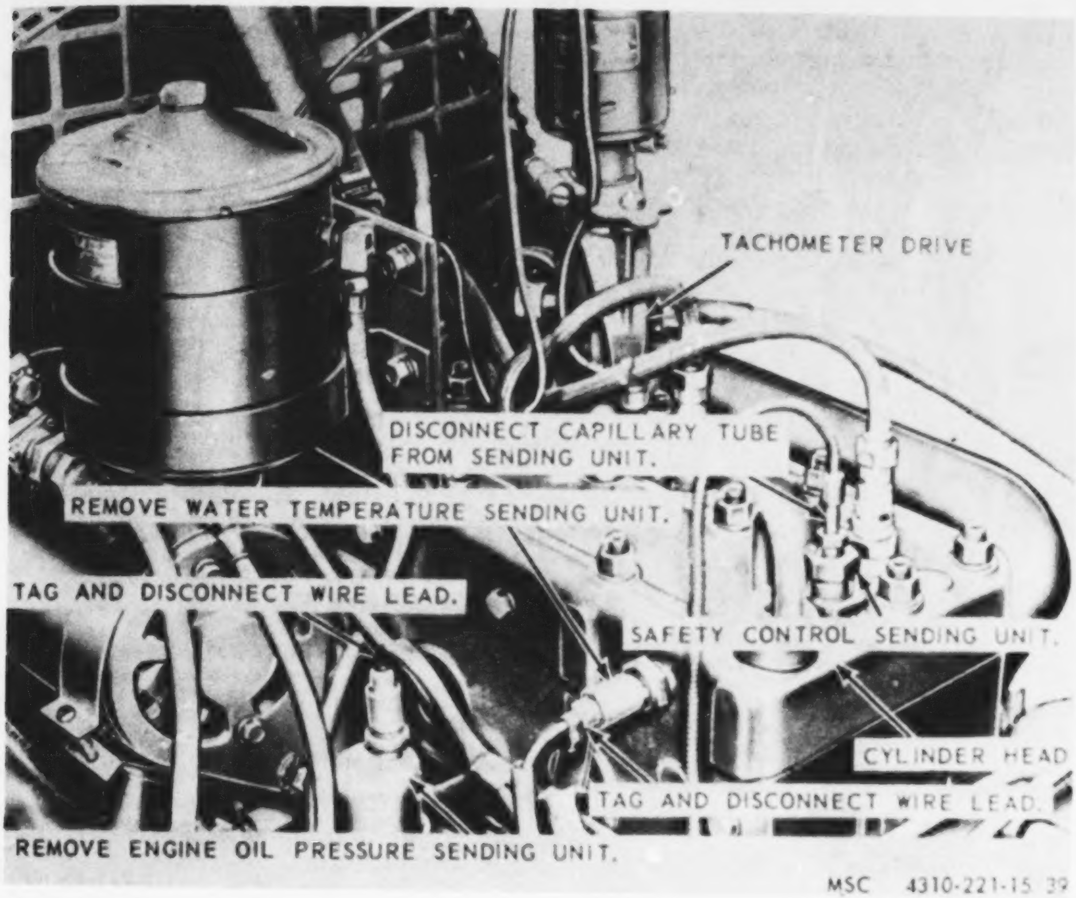

TACHOMETER DRIVE
DISCONNECT CAPILLARY TUBE FROM SENDING UNIT.
REMOVE WATER TEMPERATURE SENDING UNIT.
TAG AND DISCONNECT WIRE LEAD.
SAFETY CONTROL SENDING UNIT.
CYLINDER HEAD
TAG AND DISCONNECT WIRE LEAD.
REMOVE ENGINE OIL PRESSURE SENDING UNIT.
MSC 4310-221-15 39

Figure 39. Water temperature, safety control, and engine oil pressure sending units, removal and installation.

(*b*) Remove the oil level gage and globe valve as instructed on figure 40.

(2) *Cleaning and Inspection.*

(*a*) Clean the oil level gage with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the gage for cracked or broken glass, proper operation, and damaged float. Replace defective gage.

(*c*) Inspect globe valve for leaks and proper operation. Replace a defective globe valve.

(3) *Installation.*

(*a*) Install the oil level gage and globe valve in reverse of the instructions on figure 40.

(*b*) Fill the air receiver—oil separator tank according to the current lubrication order.

81. Sending Units

a. Engine Oil Pressure Gage Sending Unit.

(1) *Removal.* Remove the engine oil pressure gage sending unit as instructed on figure 39.

(2) *Cleaning and Inspection.*

(*a*) Clean the sending unit with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the sending unit for cracks, breaks, broken or damaged terminals, and broken wires. Replace a defective sending unit.

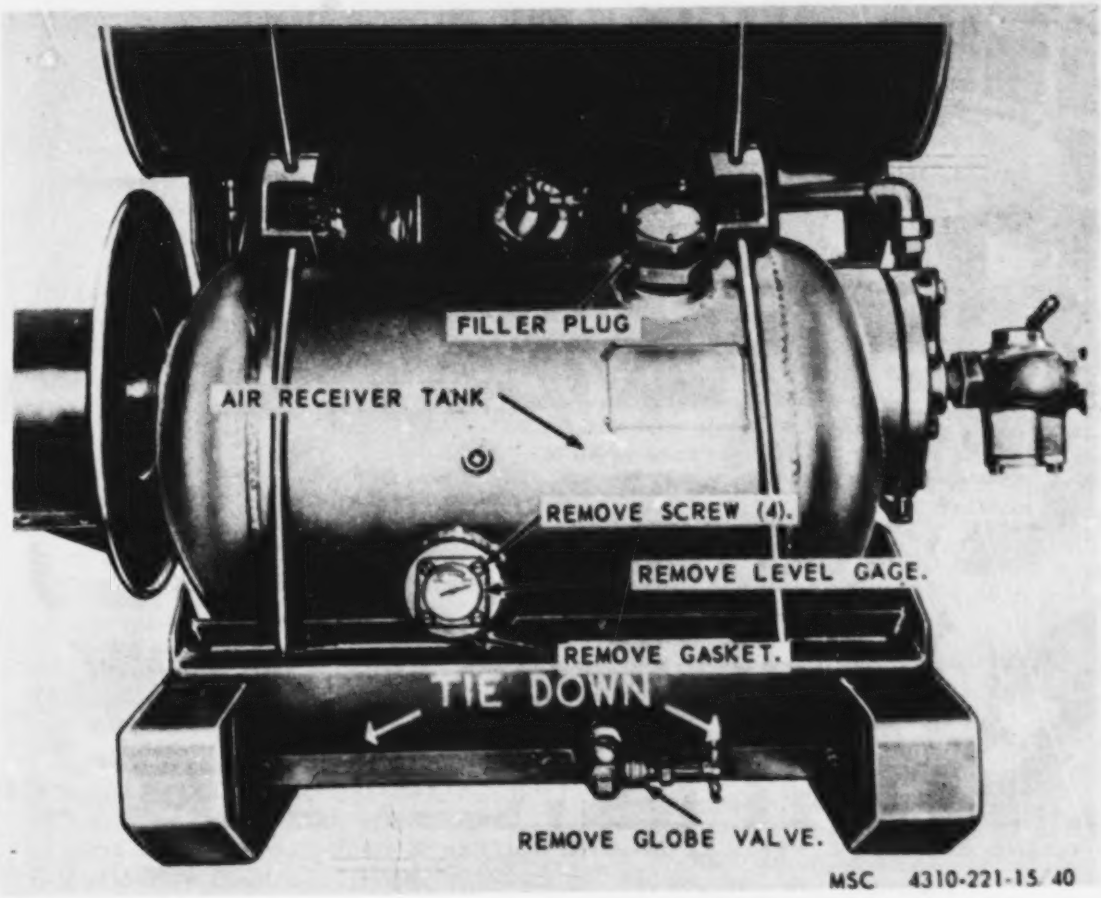

FILLER PLUG
AIR RECEIVER TANK
REMOVE SCREW (4).
REMOVE LEVEL GAGE.
REMOVE GASKET.
TIE DOWN
REMOVE GLOBE VALVE.
MSC 4310-221-15 40

Figure 40. Compressor air receiver—oil separator level gage and globe valve, removal and installation.

(3) *Installation.* Install the engine oil pressure gage sending unit in reverse of the instructions on figure 39.

b. Air Interstage Pressure Gage Sending Unit.

(1) *Removal.* Remove the air interstage pressure gage sending unit as instructed on figure 41.

(2) *Cleaning and Inspection.*

(*a*) Clean the sending unit with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the sending unit for cracks, breaks, and broken or damaged tubing. Replace a defective sending unit.

(3) *Installation.* Install the air interstage pressure gage sending unit in reverse of the instructions on figure 41.

c. Compressor Oil Temperature Gage Sending Unit.

(1) *Removal.*

(*a*) Drain air receiver - oil separator tank (fig. 8).

(*b*) Remove the compressor oil temperature gage and sending unit as instructed on figure 38 and figure 42.

(2) *Cleaning and Inspection.*

(*a*) Clean the sending unit with a cloth dampened in an approved cleaning solvent and dry thoroughly.

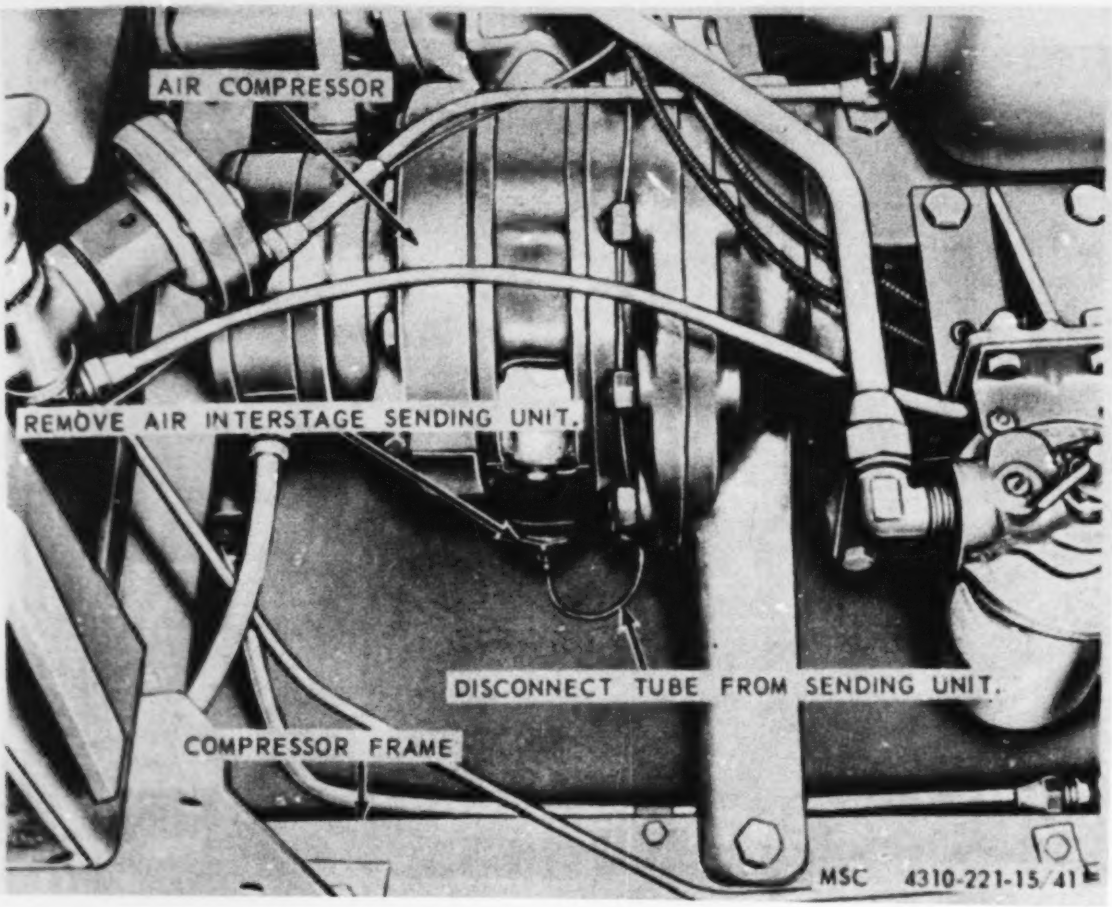

AIR COMPRESSOR
REMOVE AIR INTERSTAGE SENDING UNIT.
DISCONNECT TUBE FROM SENDING UNIT.
COMPRESSOR FRAME
MSC 4310-221-15/41

Figure 41. Air interstage pressure gage sending unit—removal and installation.

(*b*) Inspect the sending unit for cracks, breaks, and broken or damaged capillary tube. Replace a defective sending unit.

(3) *Installation.*

(*a*) Install the compressor oil temperature gage and sending unit in reverse of the instructions on figures 42 and 38.

(*b*) Fill air receiver - oil separator tank according to the current lubrication order.

d. Air Discharge Pressure Gage Sending Switch.

(1) *Removal.* Remove the air discharge pressure gage sending switch as instructed on figure 43.

(2) *Cleaning and Inspection.*

(*a*) Clean the sending switch with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the sending switch for cracks, breaks, and broken or damaged wiring. Replace a defective sending unit.

(3) *Installation.* Install the air discharge pressure gage sending switch in reverse of the instructions on figure 43.

e. Engine Safety Control Sending Unit (Serial Nos. 125CR24901 through 125CR-25400).

(1) *Removal.* Remove the engine safety control sending unit as instructed on figures 38 and 39.

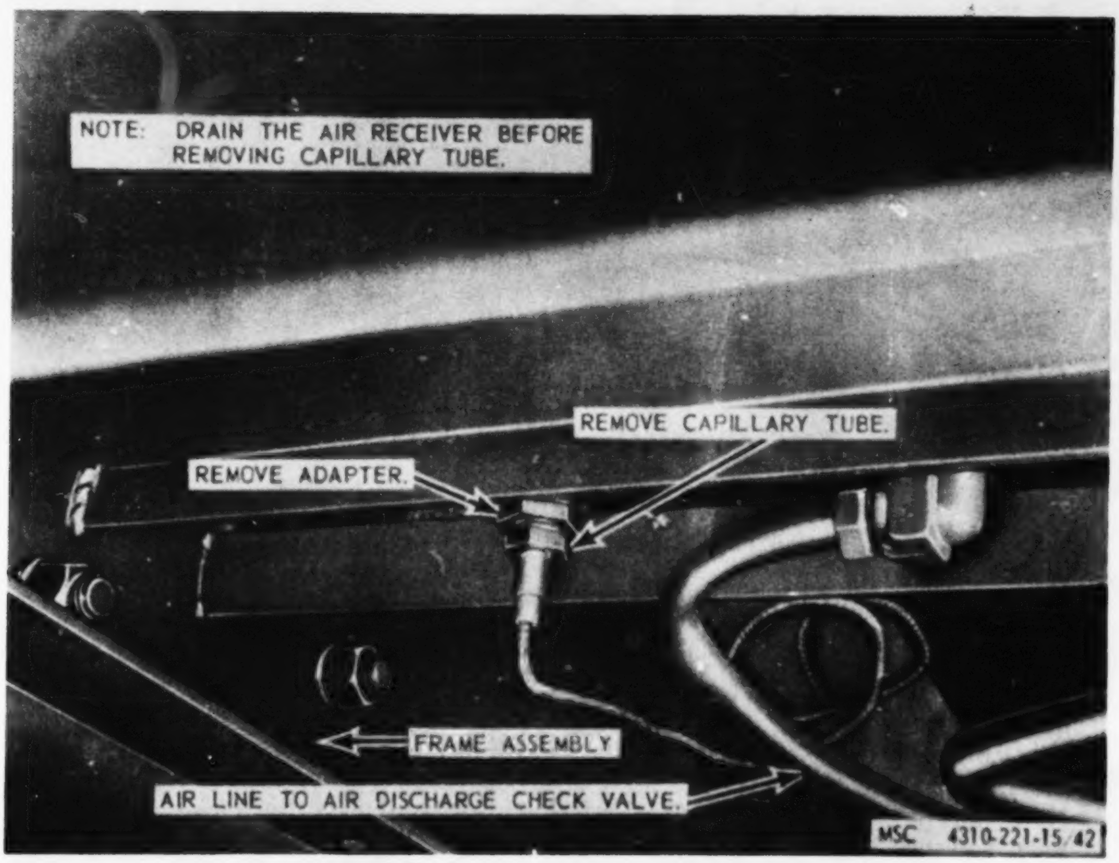

NOTE: DRAIN THE AIR RECEIVER BEFORE REMOVING CAPILLARY TUBE.
REMOVE CAPILLARY TUBE.
REMOVE ADAPTER.
FRAME ASSEMBLY
AIR LINE TO AIR DISCHARGE CHECK VALVE.
MSC 4310-221-15/42

Figure 42. Compressor oil temperature gage sending unit, removal and installation.

(2) *Cleaning and Inspection.*

(*a*) Clean the sending unit with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the sending unit for kinks, breaks, evidence of leaking, or other damage. Replace a defective sending unit.

(3) *Installation.* Install the engine safety control sending unit in reverse of the instructions on figures 39 and 38.

f. Engine Water Temperature Gage Sending Unit.

(1) *Removal.* Remove the engine water temperature gage sending unit as instructed on figures 38 and 39.

(2) *Cleaning and Inspection.*

(*a*) Clean the sending unit with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(*b*) Inspect the sending unit for cracks, breaks, and broken or damaged terminal. Replace a defective sending unit.

(3) *Installation.* Install the water temperature gage sending unit in reverse of the instructions on figures 39 and 38.

82. Wiring Harness

a. Inspection. Inspect the wiring for oil-soaked, cracked, or frayed insulation, broken wires, and loose or corroded connections.

b. Repair. Disconnect defective lead at both ends and tape bare wires. Connect a new lead and tape to wiring harness.

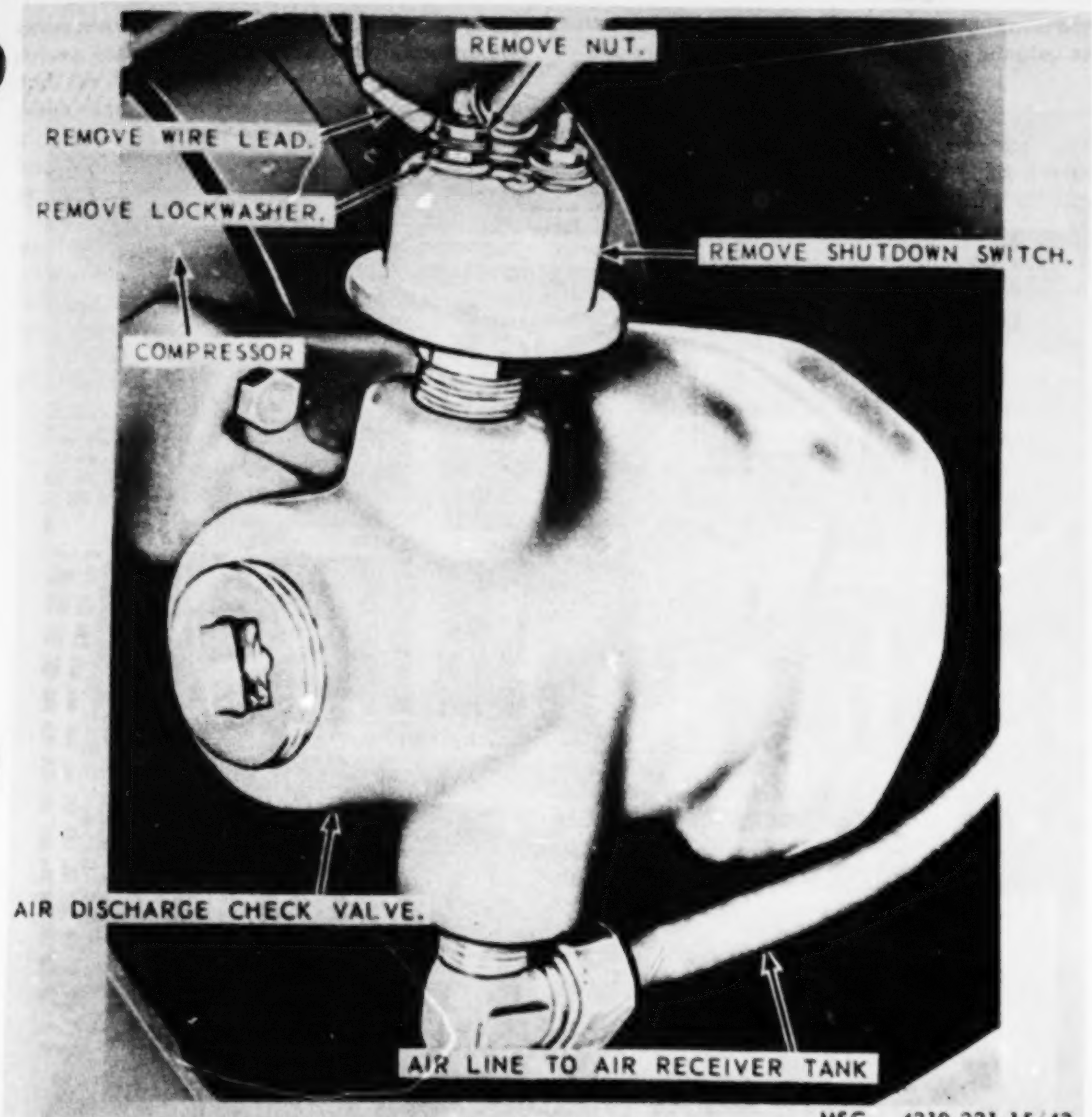
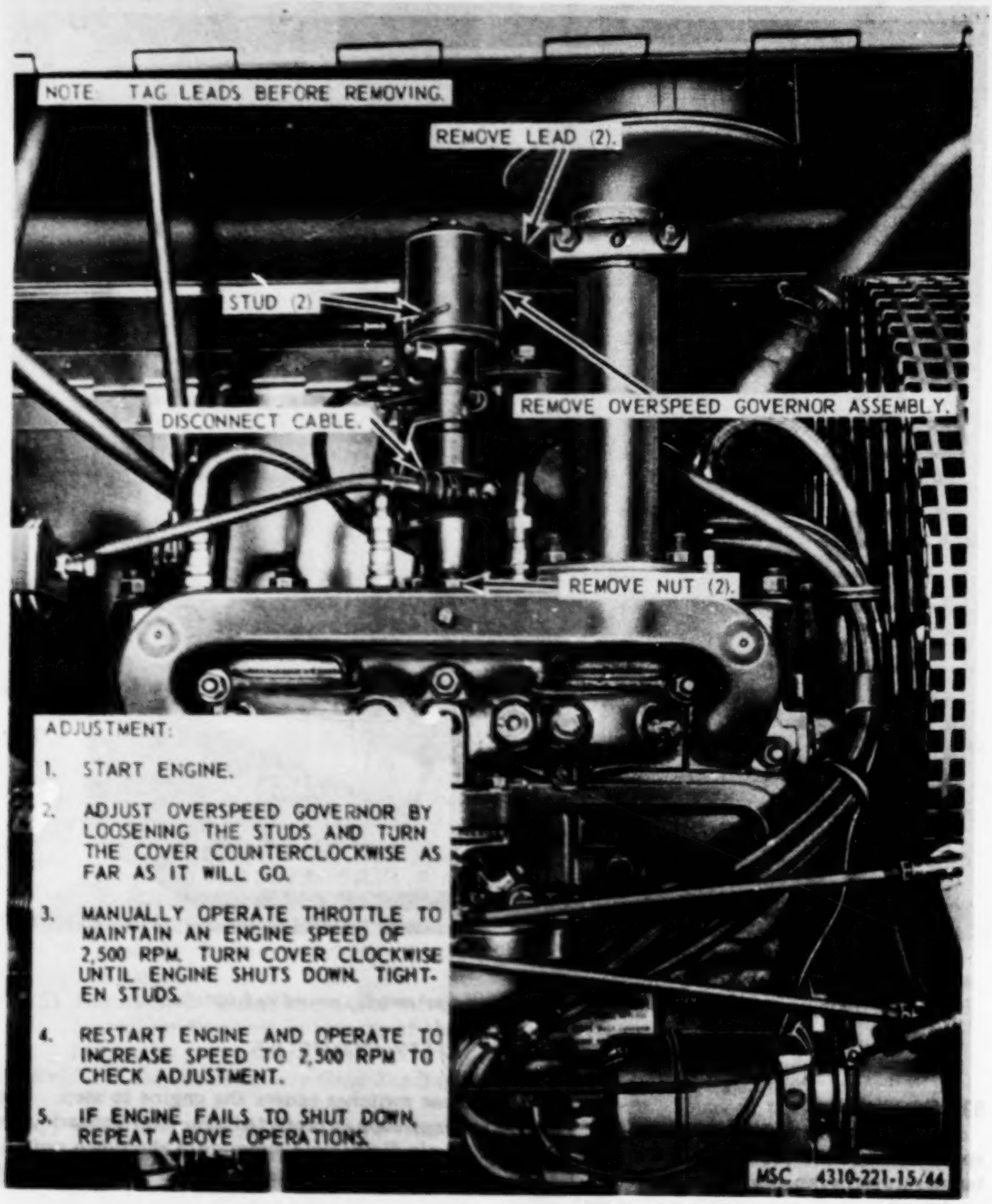

REMOVE NUT.
REMOVE WIRE LEAD.
REMOVE LOCKWASHER.
REMOVE SHUTDOWN SWITCH.
COMPRESSOR
AIR DISCHARGE CHECK VALVE.
AIR LINE TO AIR RECEIVER TANK
MSC 4310-221-15/43

Figure 43. Air discharge pressure gage sending switch, removal and installation.

Section XIII. ENGINE SAFETY CONTROLS

83. General

The gasoline engine is protected against overspeeding, low oil pressure, and high coolant temperature by an engine overspeed governor, engine oil temperature switch, and engine water temperature switch. The closing of one of these switches causes the engine to stop. The compressor is protected against overheating by an air discharge temperature shutdown switch. A safety valve mounted on the air receiver oil separator protects against build up of too much pressure in the tank (par. 102*b*). The engine


NOTE: TAG LEADS BEFORE REMOVING.
REMOVE LEAD (2).
STUD (2)
REMOVE OVERSPEED GOVERNOR ASSEMBLY.
DISCONNECT CABLE.
REMOVE NUT (2).
MSC 4310-221-15/44

ADJUSTMENT:

1. START ENGINE.
2. ADJUST OVERSPEED GOVERNOR BY LOOSENING THE STUDS AND TURN THE COVER COUNTERCLOCKWISE AS FAR AS IT WILL GO.
3. MANUALLY OPERATE THROTTLE TO MAINTAIN AN ENGINE SPEED OF 2,500 RPM. TURN COVER CLOCKWISE UNTIL ENGINE SHUTS DOWN. TIGHTEN STUDS.
4. RESTART ENGINE AND OPERATE TO INCREASE SPEED TO 2,500 RPM TO CHECK ADJUSTMENT.
5. IF ENGINE FAILS TO SHUT DOWN, REPEAT ABOVE OPERATIONS.

Figure 44. Engine overspeed governor and tachometer drive, removal, installation, and adjustment.

overspeed governor is driven by the oil pump-driven gear pin through the distributor adapter and the tachometer drive adapter. A flyball mechanism causes the switch to close when engine speed becomes excessive, thereby grounding the magneto. The overspeed governor is located on the top of the cylinder head.

Caution: **The cause of engine shutdown must be determined and corrected before restarting the engine. Do not disconnect any of the shutdown switches in order to operate the compressor.**

84. Engine Overspeed Governor and Tachometer Drive

a. *Removal and Disassembly.*

(1) Remove the overspeed governor and tachometer drive assembly as instructed on figure 44.

(2) Disassemble the overspeed governor from the tachometer drive adapter as instructed on figure 45.

b. *Cleaning and Inspection.*

(1) Clean the overspeed governor and tachometer drive with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Inspect the governor and tachometer drive for cracks, breaks, and defective operation. Replace defective parts as necessary.

c. *Reassembly, Installation, and Adjustment.*

(1) Reassemble the overspeed governor on the tachometer drive adapter in reverse of the instructions on figure 45.

(2) Install and adjust the governor in reverse of the instructions on figure 44.

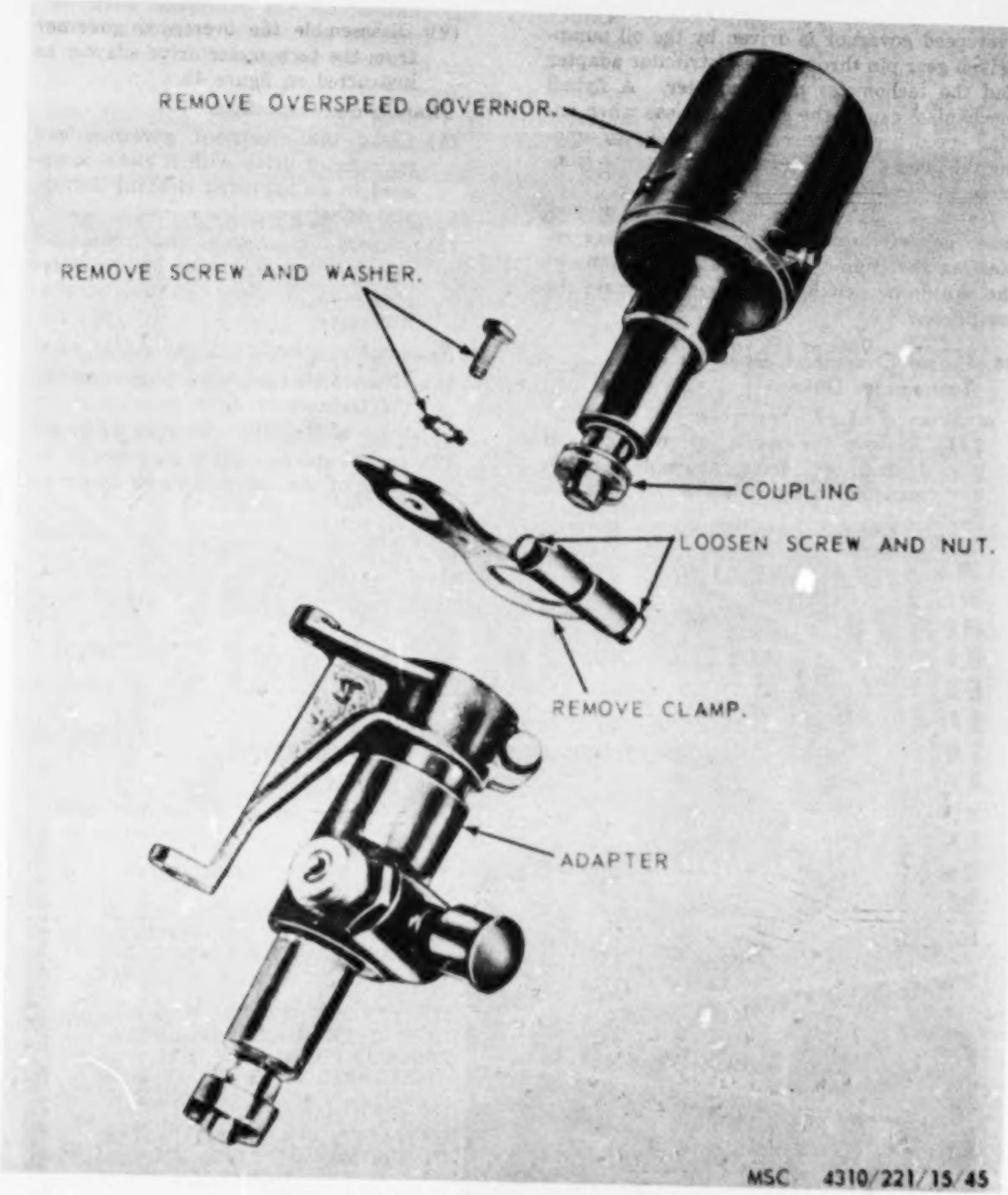

REMOVE OVERSPEED GOVERNOR.
REMOVE SCREW AND WASHER.
COUPLING
LOOSEN SCREW AND NUT.
REMOVE CLAMP.
ADAPTER
MSC 4310/221/15/45

Figure 45. Overspeed governor and tachometer drive, partially exploded view.

Section XIV. EXHAUST SYSTEM

85. General

The exhaust system consists of the exhaust manifold which provides an individual passage from each cylinder to carry the exhaust gas from the combustion chambers to the exhaust pipe and out through the muffler. The exhaust manifold is a one-piece casting, attached to the right side of the cylinder head. The cylinder head is an L-head, cast-iron type secured to the cylinder block with nuts, studs, and lifting eyes.

86. Muffler and Exhaust Pipe

a. Removal. Remove the muffler and exhaust pipe as instructed on figure 46.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the muffler, rain cap, and exhoust pipe for holes, breaks, dents, cracks, and rusted-out places.

(3) Replace a defective muffler, rain cap, exhaust pipe, and mounting gasket.

c. Installation. Install the muffler and exhaust pipe in reverse of the instructions on figure 46.

87. Exhaust-Intake Manifold

a. Removal.

(1) Remove the muffler and exhaust pipe from the manifold (par. 86).

(2) Remove the carburetor from manifold (par. 59).

(3) Remove the exhaust-intake manifold as instructed on figure 47.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect exhaust-intake manifold for cracks, breaks, or warpage. Replace a defective manifold and gasket.

c. Installation.

(1) Install the exhaust-intake manifold in reverse of the instructions on figure 47.

(2) Install the carburetor on the manifold (par. 59).

(3) Install the muffler and exhaust pipe (par. 86).

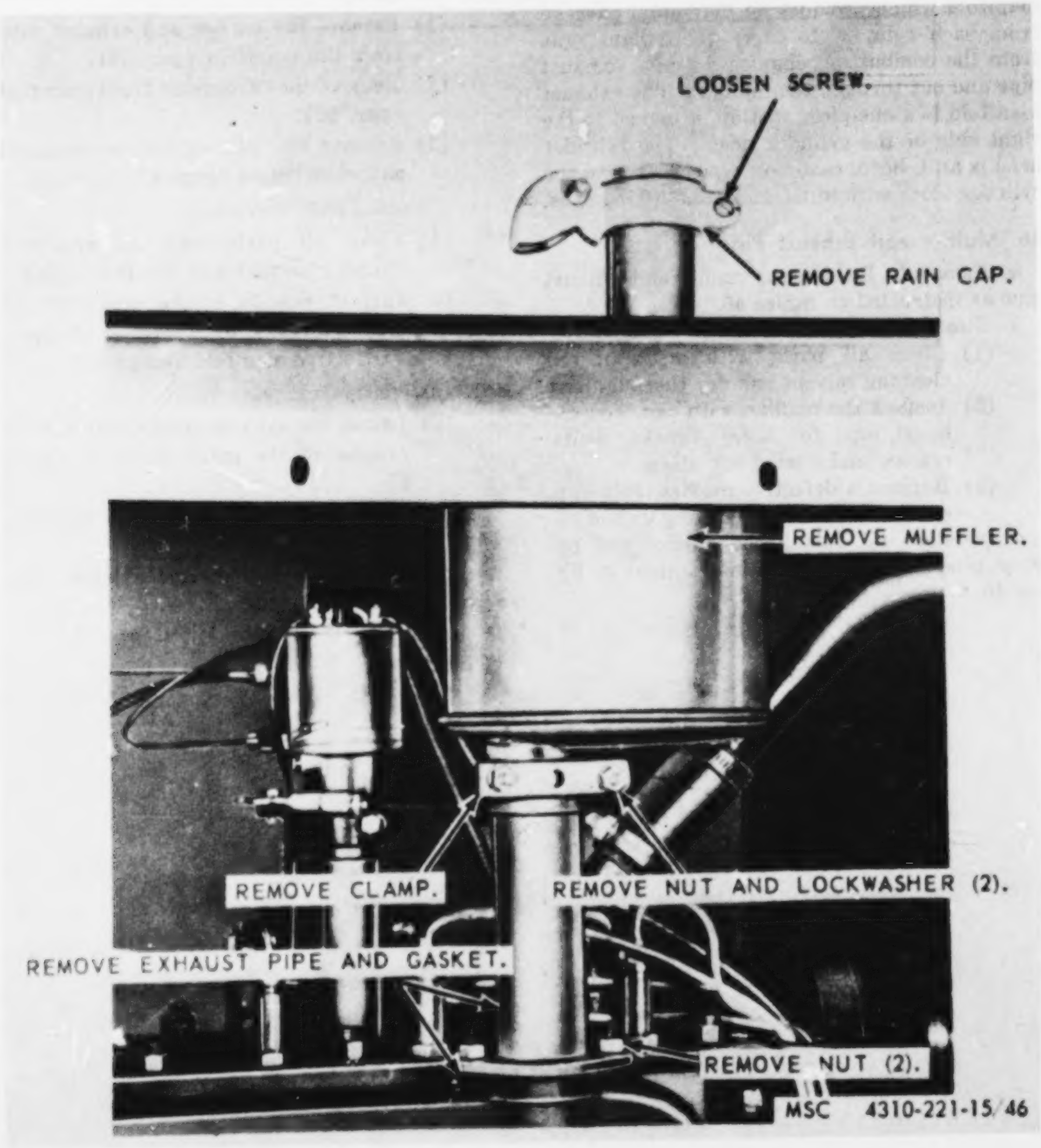

LOOSEN SCREW.
REMOVE RAIN CAP.
REMOVE MUFFLER.
REMOVE CLAMP.
REMOVE NUT AND LOCKWASHER (2).
REMOVE EXHAUST PIPE AND GASKET.
REMOVE NUT (2).
MSC 4310-221-15/46

Figure 46. Muffler and exhaust pipe, removal and installation.

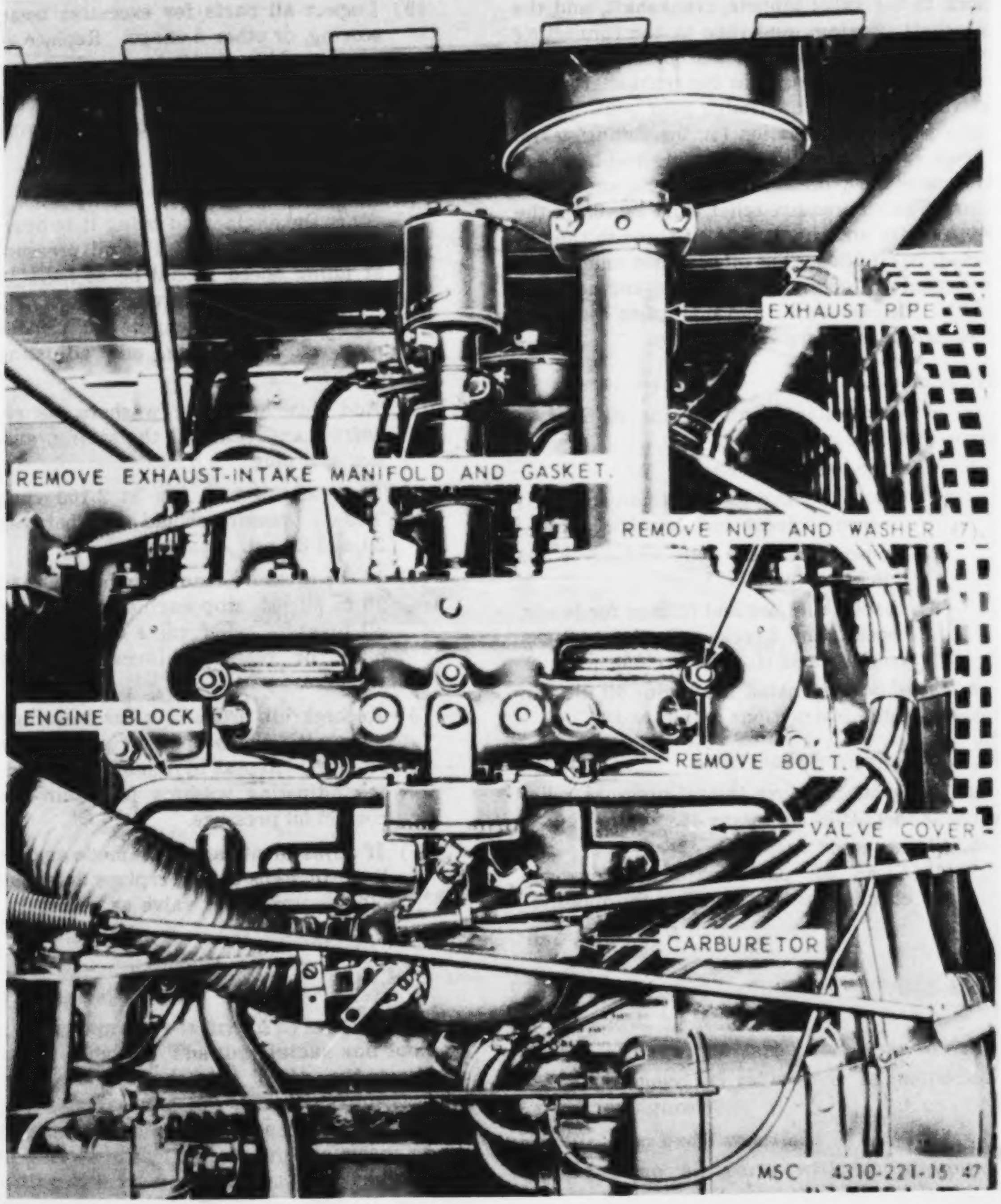

EXHAUST PIPE
REMOVE EXHAUST-INTAKE MANIFOLD AND GASKET.
REMOVE NUT AND WASHER (7).
ENGINE BLOCK
REMOVE BOLT.
VALVE COVER
CARBURETOR
MSC 4310-221-15 47

Figure 47. Exhaust-intake manifold, removal and installation.

88. General

The oil pump draws oil from the oil pan and forces it through drilled passages in the cylinder block to the valve tappets, crankshaft, and the camshaft bearings and then to the connecting rod bearings through drilled passages in the crankshaft. A passage in the crankshaft front bearing to a jet in the timing gear housing provides positive lubrication for the timing gears. Direct spray from the connecting rod bearings lubricates the cylinder walls, pistons, and piston pins. The oil pressure relief valve regulates the oil pressure and the flow of oil through the bypass-type oil filter. The oil pressure relief valve is located on the right side of the engine block behind the carburetor and maintains a specific pressure in the lubrication system.

89. Engine Oil Filter

a. Removal. Remove the engine oil filter as instructed on figure 10.

b. Cleaning and Inspection.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the filter body and cover for cracks, or breaks.

(3) Inspect all lines and fittings for bends, cracks, and breaks. Replace all defective parts if unserviceable.

c. Installation. Install the engine oil filter in reverse of the instructions on figure 10.

90. Oil Pressure Relief Valve

a. Removal. Remove the oil pressure relief valve as instructed on figure 48.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Remove all dirt and foreign matter from relief valve opening in the engine block.

(3) Inspect all parts for excessive wear, scoring, or other damage. Replace all unserviceable parts.

c. Installation. Install the oil pressure relief valve in reverse of the instructions on figure 48.

d. Adjustment.

(1) Start the engine and bring it to operating temperature. The oil pressure at idling speed should be at least 10 psi. If the pressure registers less than this, stop the engine and remove plug, gasket, spring, and adjusting washer (fig. 48).

(2) Add thin adjusting washers, as required, and reinstall the spring, gasket, and plug.

(3) Start engine and run at 2,100 rpm. The oil pressure should read between 20 and 30 psi.

(4) If the pressure reading is higher than 20 to 30 psi, stop engine and remove oil pressure relief valve plug and remove or replace thinner adjusting washers.

(5) Recheck oil pressure after installing plug until the proper oil pressure is reached. Repeat by removing or adding adjusting washers to obtain the correct oil pressure.

(6) If adjustment cannot be made as outlined in steps above, replace defective oil pressure relief valve as necessary.

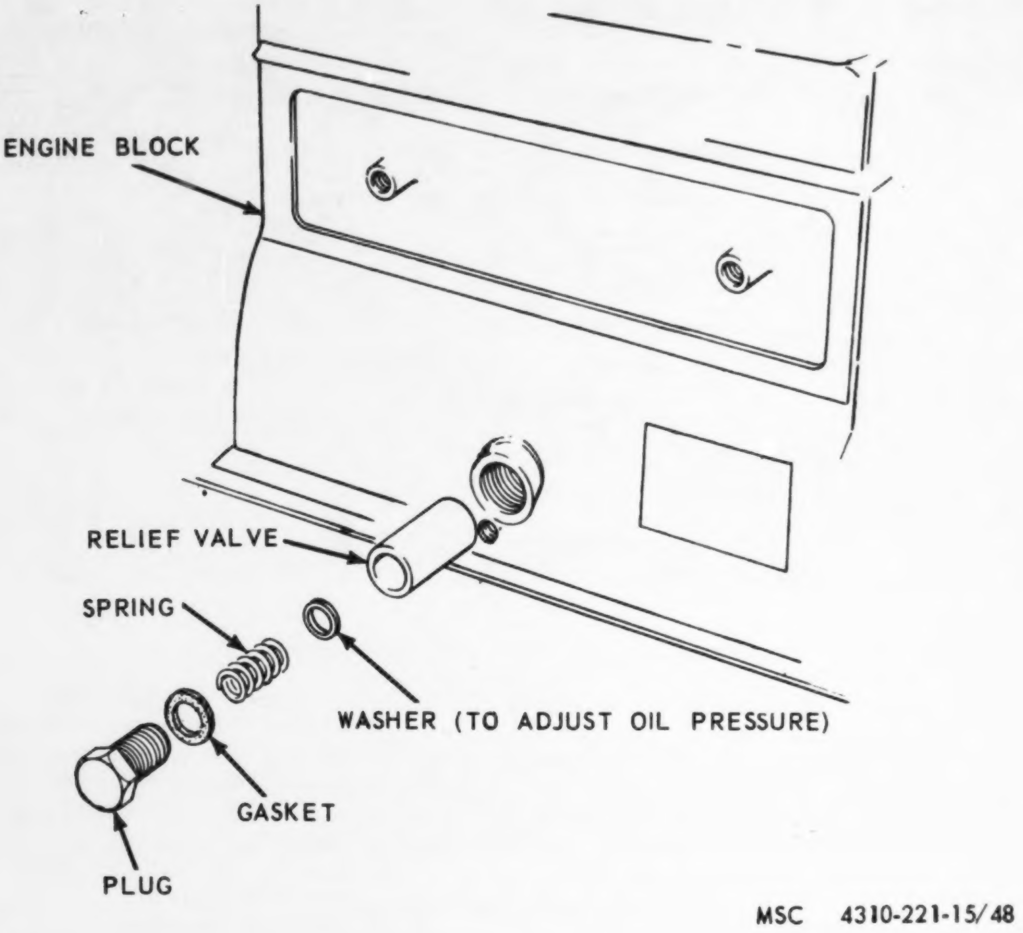

ENGINE BLOCK
RELIEF VALVE
SPRING
WASHER (TO ADJUST OIL PRESSURE)
GASKET
PLUG
MSC 4310-221-15/48

Figure 48. Oil pressure relief valve, removal and installation.

Section XVI. ENGINE ASSEMBLY

91. General

The compressor is driven by a four-cylinder, gasoline engine. The four intake and four exhaust valves are located in the cylinder block of the engine and are raised and lowered by tappets in contact with the camshaft; adjusting screws in the tappets provide means of adjusting the valve clearance. The engine governor controls the flow of the fuel-air mixture through linkage connected to the carburetor.

92. Valve Cover

a. Removal.

(1) Remove the carburetor (par. 59).

(2) Remove the valve cover as instructed on figure 49.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent. Remove the old gasket from the valve cover.

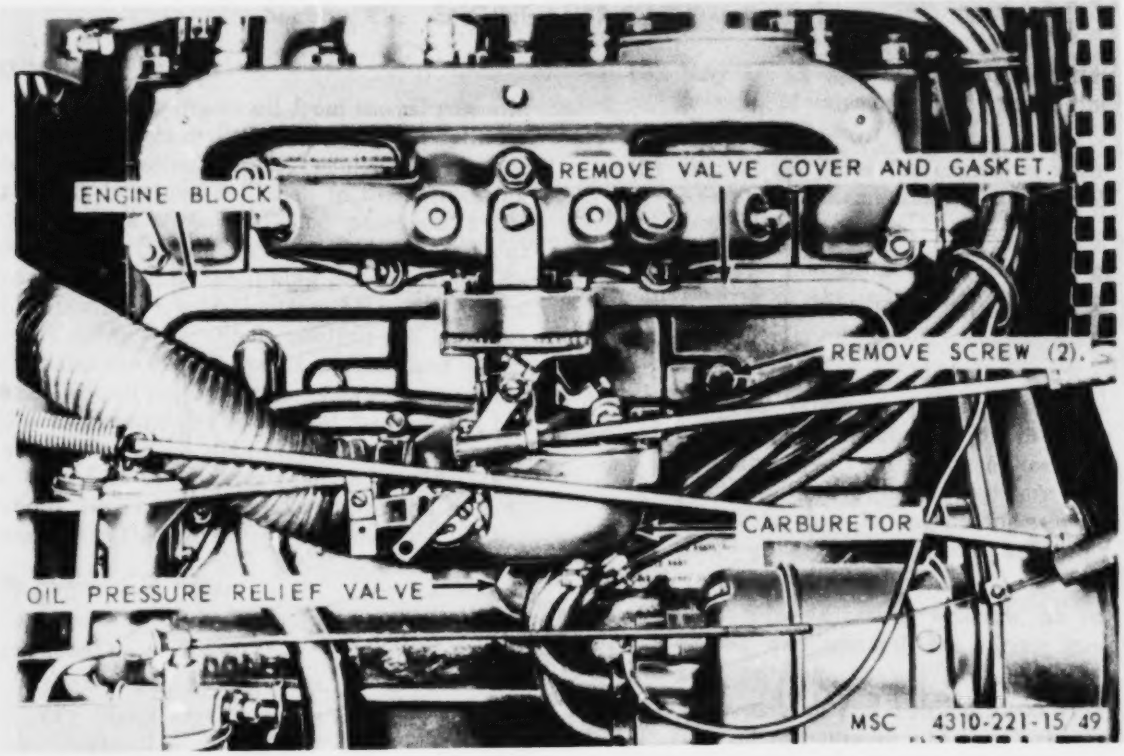


Figure 49. Valve cover, removal and installation.

(2) Inspect the valve cover for cracks, breaks, bends, and other damage. Replace defective cover and gasket.

c. Installation.

(1) Install the valve cover in reverse of the instructions on figure 49.

(2) Install the carburetor (par. 59).

93. Valve Adjustment

a. Remove the carburetor (par. 59).

b. Remove the valve cover (par. 92).

c. Adjust the valves as instructed on figure 50.

d. Install the valve cover (par. 92).

e. Install the carburetor (par. 59).

94. Cylinder Head

a. Removal.

(1) Remove the thermostat housing (par. 75).

(2) Remove the overspeed governor and tachometer drive adapter (par. 84).

(3) Remove the muffler (par. 86).

(4) Remove the spark plugs (par. 71).

(5) Remove oil filter (par. 30).

(6) Remove water temperature gage sending unit from cylinder head (par. 81).

(7) Remove the element and capillary tube of the safety control from engine head (par. 81).

(8) Remove the cylinder head as instruced on figure 51.

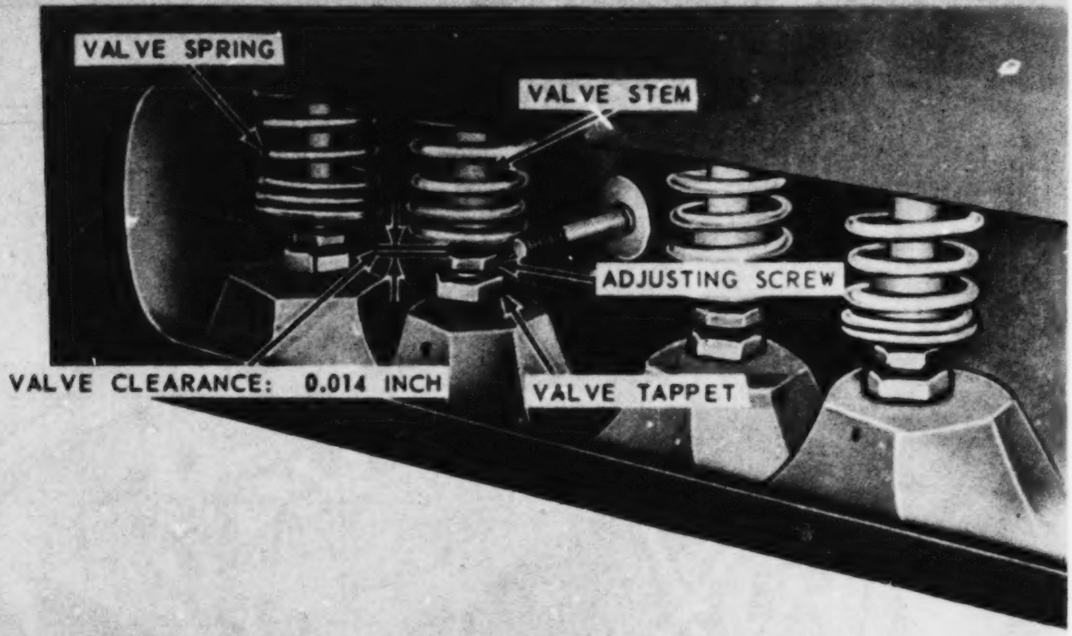
b. Cleaning and Inspection.

(1) Clean the cylinder head with an approved cleaning solvent and dry thoroughly.

(2) Carefully scrape and wire-brush all carbon deposits from the cylinder head. Remove all gasket residue.

(3) Inspect the head for cracks, breaks, and warpage. Place a straightedge lengthwise on the machined surface and with a feeler gage measure at the center the amount of bow or warpage in the cylinder head. If cylinder head is bowed or warped in excess of 0.006 inch, replace cylinder head. Place the straightedge crosswise of the ma-

NOTE: BEFORE ADJUSTING VALVES, HAVE ENGINE AT NORMAL OPERATING TEMPERATURE.



NOTE: HOLD VALVE TAPPET, TURN ADJUSTING SCREW CLOCKWISE TO INCREASE CLEARANCE AND COUNTERCLOCKWISE TO DECREASE CLEARANCE. ADJUST REMAINING VALVES IN THE SAME MANNER.

CAUTION: CRANK ENGINE FOR EACH VALVE SETTING TO BE SURE VALVE IS PROPERLY SEATED BEFORE ADJUSTMENT IS MADE.

MSC 4310-221-15/50

Figure 50. Valve adjustment.

chined surface of the head and measure with a feeler gage at the center of the head. If the head is crowned in excess of 0.004 inch, replace cylinder head.

(4) Replace defective studs and nuts if threads are damaged.

Note. Planing or milling of the cylinder head to remove crown or bow is not recommended, as any amount of metal removed from any point of the machined surface of the head will change the compression ratio and in many instances cause a sharp knock in the engine.

c. Installation.

(1) Install the cylinder head in reverse of the instructions on figure 51.

(2) Tighten cylinder-head nuts as instructed on figure 52.

(3) Install the element and capillary tube of the safety control (par. 81).

(4) Install the water temperature gage sending unit to the cylinder-head (par. 81).

(5) Install the oil filter (par. 30).

(6) Install the spark plugs (par. 71).

(7) Install the muffler (par. 86).

(8) Install the overspeed governor and tachometer drive adapter (par. 84).

(9) Install the thermostat housing (par. 75).

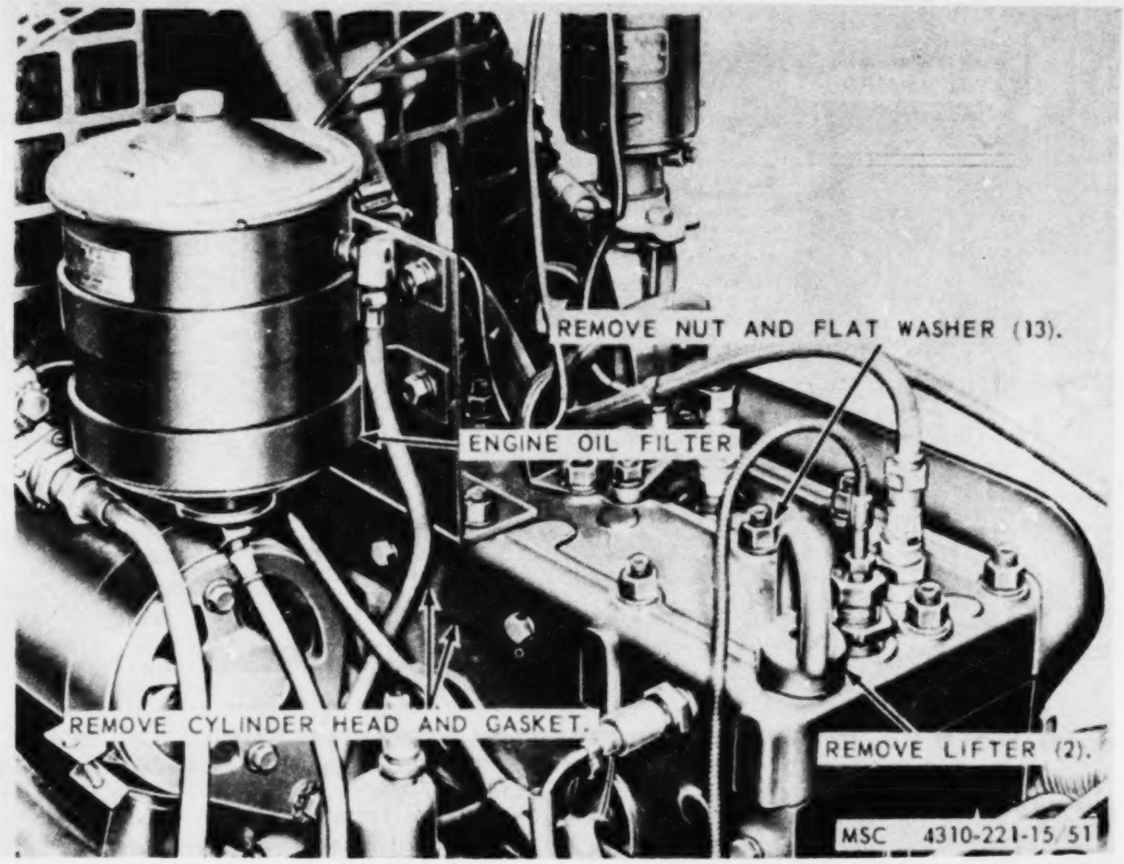

REMOVE NUT AND FLAT WASHER (13).
ENGINE OIL FILTER
REMOVE CYLINDER HEAD AND GASKET.
REMOVE LIFTER (2).
MSC 4310-221-15/51

Figure 51. Cylinder head, removal and installation.

95. Engine Speed Governor Controls

a. Removal. Remove the engine speed governor controls and governor in the numerical sequence as instructed on figure 53.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent.

(2) Inspect all parts for breaks, bends, and damaged threads.

(3) Inspect all springs for proper tension. Replace all defective parts as necessary.

c. Installation and Adjustment.

(1) Install the engine speed governor controls and governor in the reverse of the numerical sequence as instructed on figure 53.

(2) Adjust the engine speed governor and controls as instructed on figure 53.

96. Engine Speed Governor

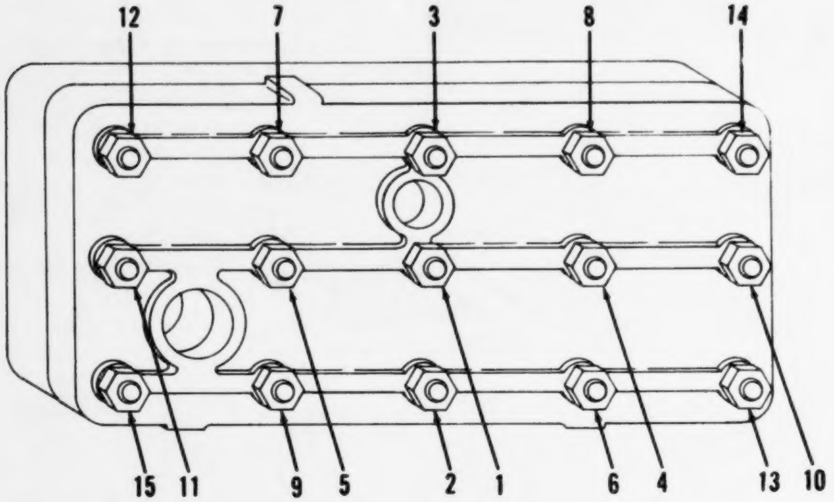
a. Removal. Remove the governor controls and governor (par. 95).

b. Cleaning, Inspection, and Repair.

(1) Clean the exterior of the engine speed governor with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Inspect the governor for breaks, cracks, and proper operation. Replace or repair a defective governor.

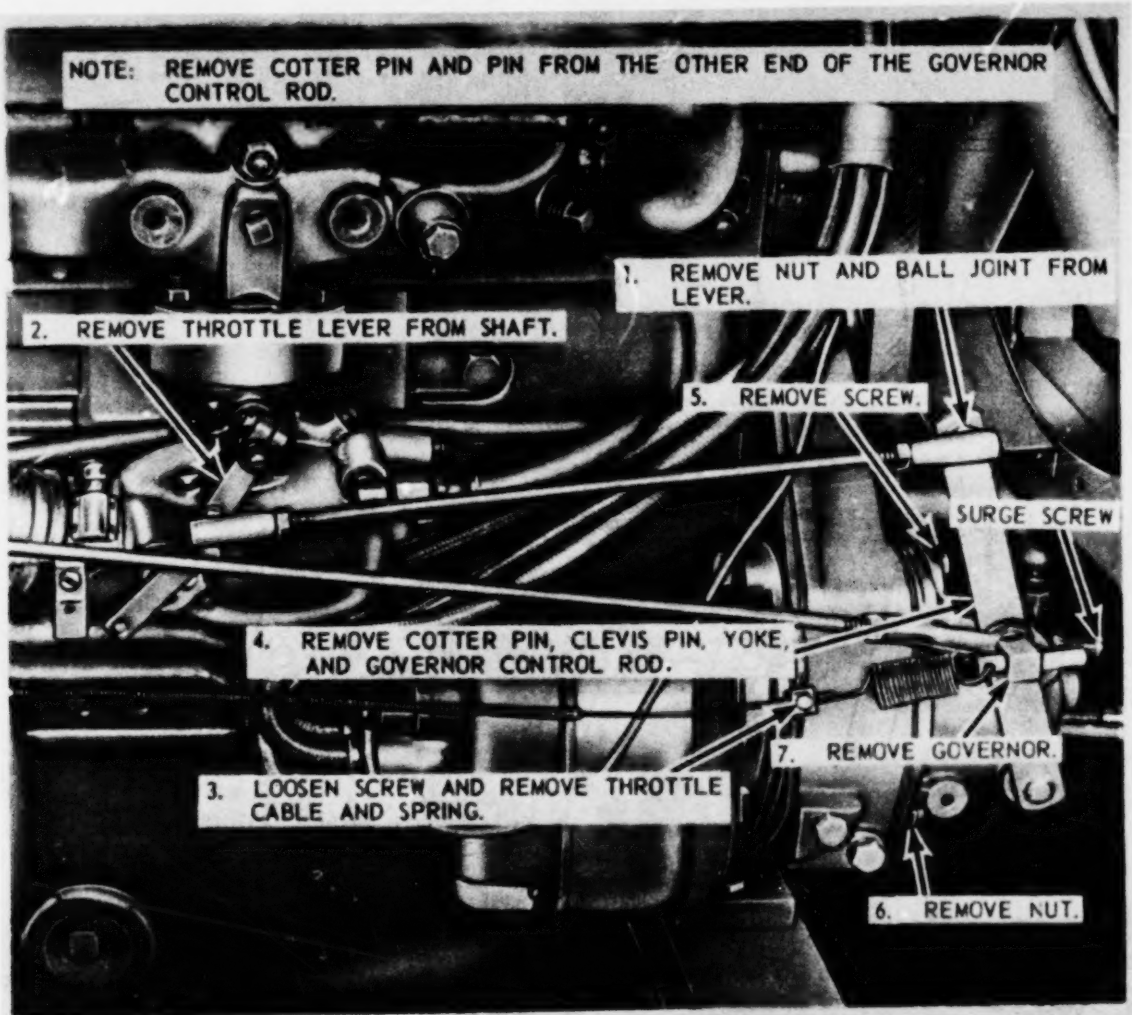
c. Installation. Install the governor and controls (par. 95).


12
7
3
8
14
15
11
9
5
2
1
6
4
13
10

NOTE: TIGHTEN CYLINDER-HEAD NUTS IN 15 FT-LB INCREMENTS TO 70-75 FT-LB TORQUE.

MSC 4310-221-15/52

Figure 52. Cylinder-head nuts tightening sequence.



NOTE: REMOVE COTTER PIN AND PIN FROM THE OTHER END OF THE GOVERNOR CONTROL ROD.

1. REMOVE NUT AND BALL JOINT FROM LEVER.

2. REMOVE THROTTLE LEVER FROM SHAFT.

5. REMOVE SCREW.

SURGE SCREW

4. REMOVE COTTER PIN, CLEVIS PIN, YOKE, AND GOVERNOR CONTROL ROD.

7. REMOVE GOVERNOR.

3. LOOSEN SCREW AND REMOVE THROTTLE CABLE AND SPRING.

6. REMOVE NUT.

ADJUSTMENT:

1. WITH THE ENGINE STOPPED, THE GOVERNOR SHOULD HOLD THE THROTTLE BUTTERFLY OF THE CARBURETOR WIDE OPEN.
2. LOOSEN LOCKNUT ON GOVERNOR CONTROL ROD AND TURN CONTROL ROD IN OR OUT. THE BUTTERFLY IN THE CARBURETOR SHOULD BE WIDE OPEN.
3. START ENGINE AND ALLOW TO WARM UP.
4. IF ENGINE SURGES AT NO-LOAD IDLE, SHUT DOWN ENGINE. TURN SURGE SCREW ONE FULL TURN CLOCKWISE. REPEAT UNTIL SURGE IS TAKEN OUT. LOCK SURGE SCREW.

NOTE: DO NOT RAISE IDLE SPEED MORE THAN 10 TO 15 RPM.

MSC 4310-221-15/53

Figure 53. Engine speed governor controls and governor, removal, installation, and adjustment.

Section XVII. COMPRESSOR LUBRICATING SYSTEM

97. General

The air compressor is equipped with a full-flow, pressure-type lubrication system. The lubrication system consists of an air-receiver oil-separator tank, oil pump, air compressor assembly, oil cooler, and oil filter. The air receiver tank, mounted on the rear of the compressor and below the fuel tank, houses the oil separator assembly and is also a combination oil and compressed air reservoir. The oil filter is mounted on the right side of the compressor and filters the oil before recirculation. The oil pump supplies the compressor with a constant supply and is mounted on the rear of the air compressor assembly. Piping and tubing connect the assemblies in the system.

98. Compressor Oil Filter

a. Removal. Remove the compressor oil filter as instructed on figure 54.

b. Disassembly. Disassemble the compressor oil filter in the numerical sequence as illustrated on figure 55.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the cartridge assembly for a bent shaft, broken, bent, or missing filter plates, clogging, improper cleaning action, or other damage.

(3) Inspect filter head and case for cracks, breaks, obstructed passages, excessive wear, or other damage.

(4) Inspect bracket, handle, bushing, spring, ball, and sump for cracks, breaks, distortion, or other damage. Replace gasket and all unserviceable parts.

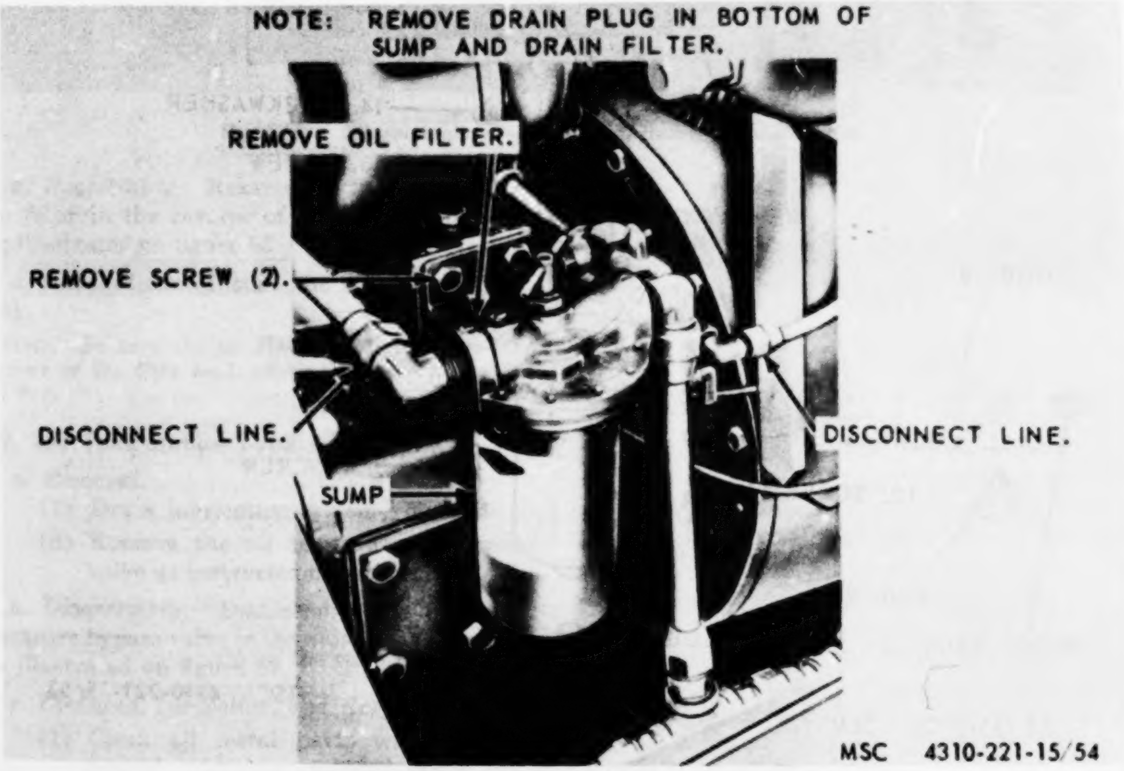


Figure 54. Compressor oil filter, removal and installation.

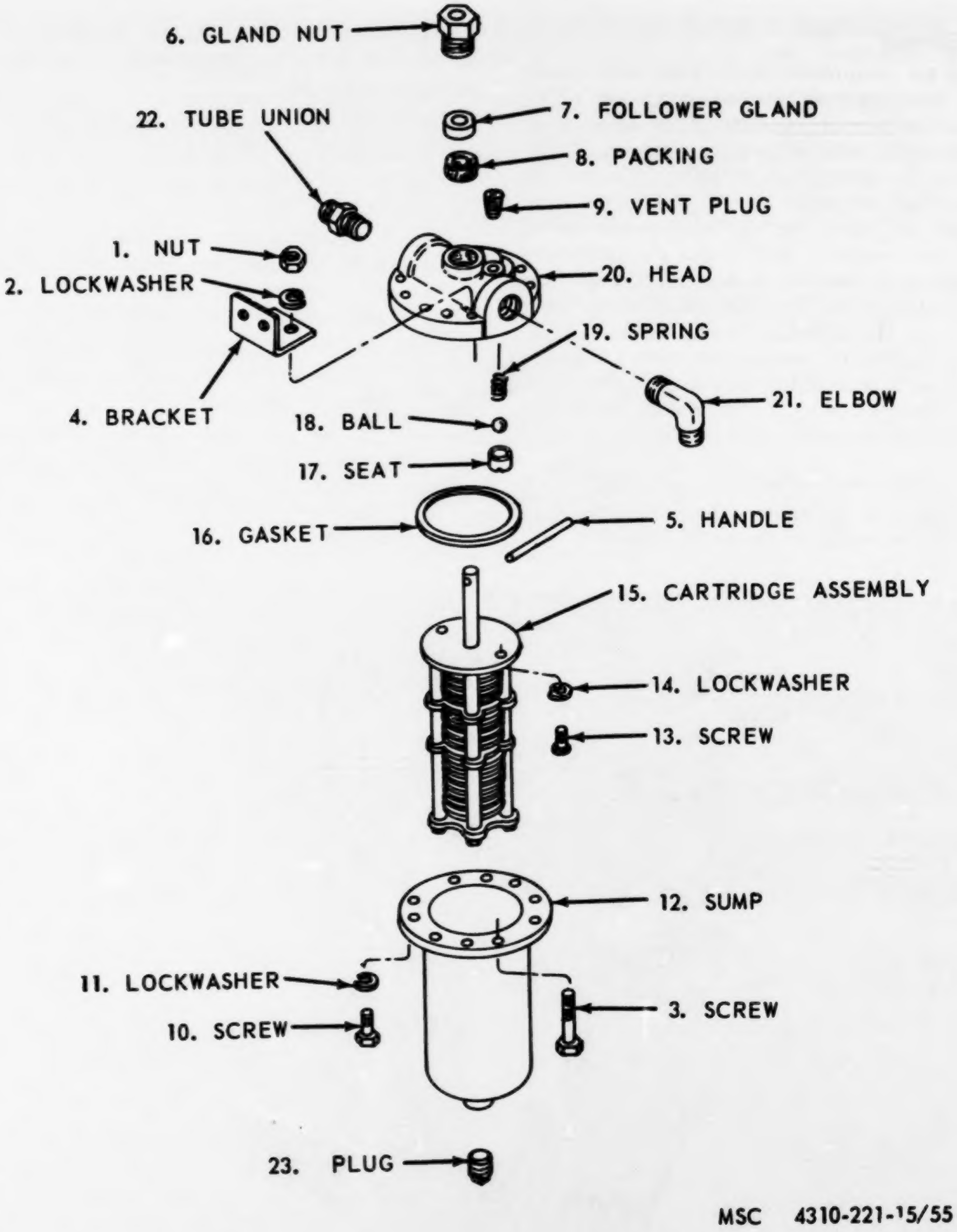

6. GLAND NUT
22. TUBE UNION
7. FOLLOWER GLAND
8. PACKING
9. VENT PLUG
1. NUT
2. LOCKWASHER
20. HEAD
19. SPRING
4. BRACKET
18. BALL
21. ELBOW
17. SEAT
16. GASKET
5. HANDLE
15. CARTRIDGE ASSEMBLY
14. LOCKWASHER
13. SCREW
12. SUMP
11. LOCKWASHER
10. SCREW
3. SCREW
23. PLUG
MSC 4310-221-15/55

Figure 55. Compressor oil filter, exploded view.

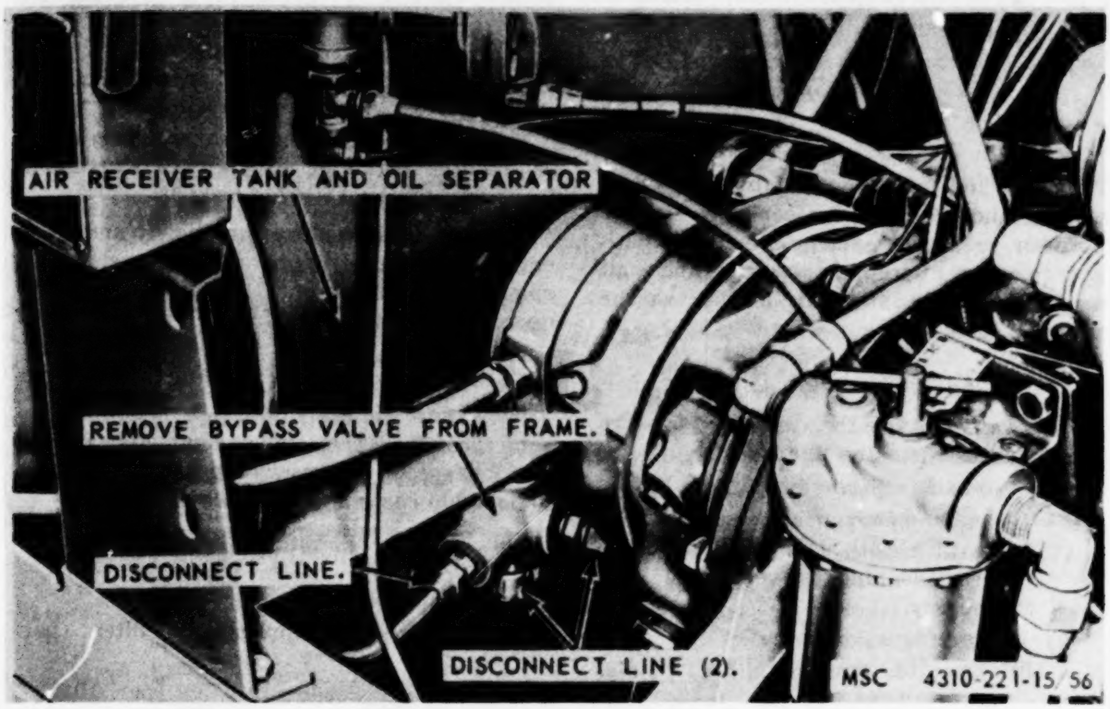

AIR RECEIVER TANK AND OIL SEPARATOR
REMOVE BYPASS VALVE FROM FRAME.
DISCONNECT LINE.
DISCONNECT LINE (2).
MSC 4310-221-15/56

Figure 56. Oil temperature bypass valve, removal and installation.

d. Reassembly. Reassemble the compressor oil filter in the reverse of numerical sequence as illustrated on figure 55.

e. Installation. Install the oil filter (par. 30).

Note. Be sure the oil filter is mounted with the arrows on the filter head pointing in the direction of oil flow.

99. Oil Temperature Bypass Valve

a. Removal.

(1) Drain lubrication system (fig. 8).

(2) Remove the oil temperature bypass valve as instructed on figure 56.

b. Disassembly. Disassemble the oil temperature bypass valve in the numerical sequence as illustrated on figure 57.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

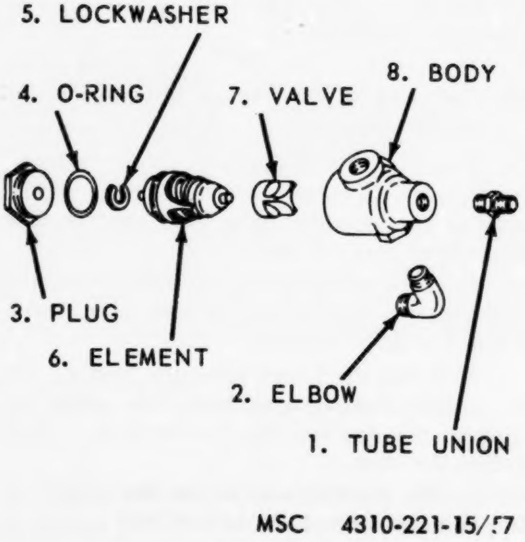

5. LOCKWASHER
4. O-RING
7. VALVE
8. BODY
3. PLUG
6. ELEMENT
2. ELBOW
1. TUBE UNION
MSC 4310-221-15/57

Figure 57. Oil temperature bypass valve—exploded view.

(2) Inspect the element and valve for excessive wear, cracks, or breaks.

(3) Replace a defective bypass valve as necessary. Replace O-ring whenever bypass valve is disassembled.

d. Reassembly. Reassemble the oil temperature bypass valve in the reverse of the numerical sequence as illustrated on figure 57.

e. Installation. Install the oil temperature bypass valve in reverse of the instructions on figure 56.

Section XVIII. AIR CONTROL SYSTEM

100. General

The speed and pressure regulator, the reducing valve, and the unloader comprise the air compressor regulation system which automatically regulates the speed of the engine and compressor according to the air demand on the compressor.

101. Speed and Pressure Regulator

a. Removal. Remove the speed and pressure regulator as instructed on figure 58.

b. Cleaning and Inspection.

(1) Clean the speed and pressure regulator with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Inspect for leaks and cracks. Inspect fittings for damaged threads and clogged orifices.

(3) Replace a defective regulator as necessary.

c. Installation. Install the speed and pressure regulator in reverse of the instructions on figure 58.

102. Compressor Air Control System Adjustment

a. To adjust the compressor air control system, turn the adjusting nut (fig. 58) so that the travel of the unloader valve is 1/4 inch with a tolerance of plus 1/32 inch.

b. Start the engine (par. 16) and operate the compressor to build up the discharge air pressure to 100 psi.

c. With the discharge pressure held at 100 psi, loosen locknut and turn the adjusting screw so that the regulator valve lever is held against the stop.

d. Loosen locknut and adjust the length of the governor control rod to hold the engine at 2,100 rpm, and tighten locknut.

e. Readjust unloading valve adjusting screw so that the regulator lever is just starting to leave the stop, and tighten locknut.

f. Raise discharge pressure slowly and when engine rpm has dropped approximately 1,400 rpm, loosen locknut and turn adjusting screw on reducing valve in. Note the highest interstage pressure obtainable. Then turn adjusting screw out until interstage pressure starts to fall. Tighten locknut.

g. Close the service valves completely and adjust low speed stop screw on pressure regulator to hold 800 rpm minimum speed.

103. Reducing Valve

a. Removal.

(1) Remove compressor oil filter (par. 30).

(2) Remove reducing valve (par. 101).

b. Cleaning and Inspection.

(1) Clean the reducing valve and lines with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Remove cap on top of reducing valve and clean out any foreign matter or corrosion surrounding the seat and cover. Replace a defective reducing valve.

c. Installation.

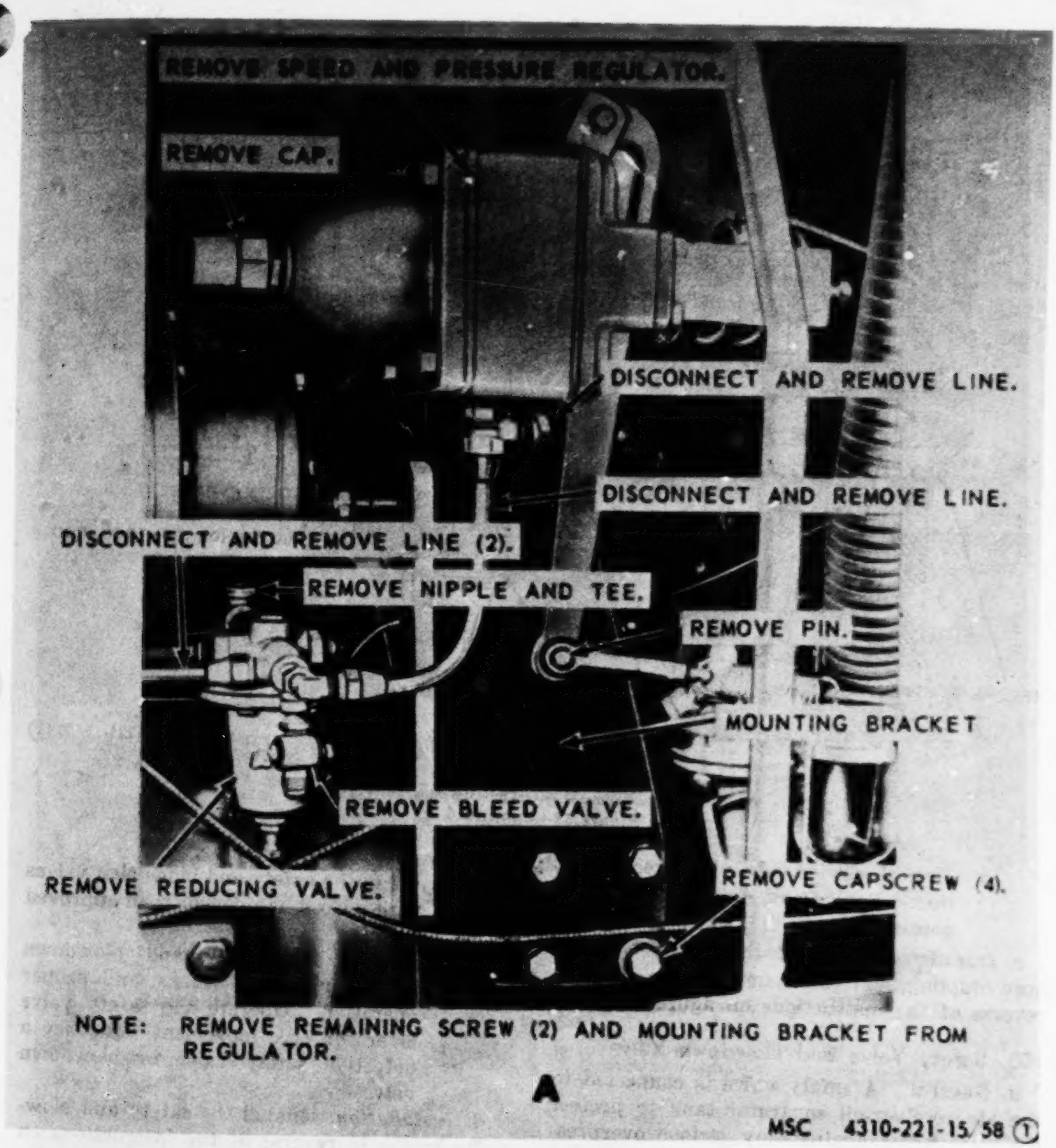
(1) Install the reducing valve (par. 101).

(2) Install the compressor oil filter (par. 30).

d. Adjustment. Adjust the regulator system (par. 102).

104. Air Discharge Service Valves, Hose Coupling, and Minimum Pressure Valve

a. Removal. Remove the service valves, hose coupling, and pressure valve as instructed on figure 59.


REMOVE SPEED AND PRESSURE REGULATOR.
REMOVE CAP.
DISCONNECT AND REMOVE LINE.
DISCONNECT AND REMOVE LINE.
DISCONNECT AND REMOVE LINE (2).
REMOVE NIPPLE AND TEE.
REMOVE PIN.
MOUNTING BRACKET
REMOVE BLEED VALVE.
REMOVE REDUCING VALVE.
REMOVE CAPSCREW (4).
A
MSC 4310-221-15/58 ①

NOTE: REMOVE REMAINING SCREW (2) AND MOUNTING BRACKET FROM REGULATOR.

A—Speed and pressure regulator and reducing valve

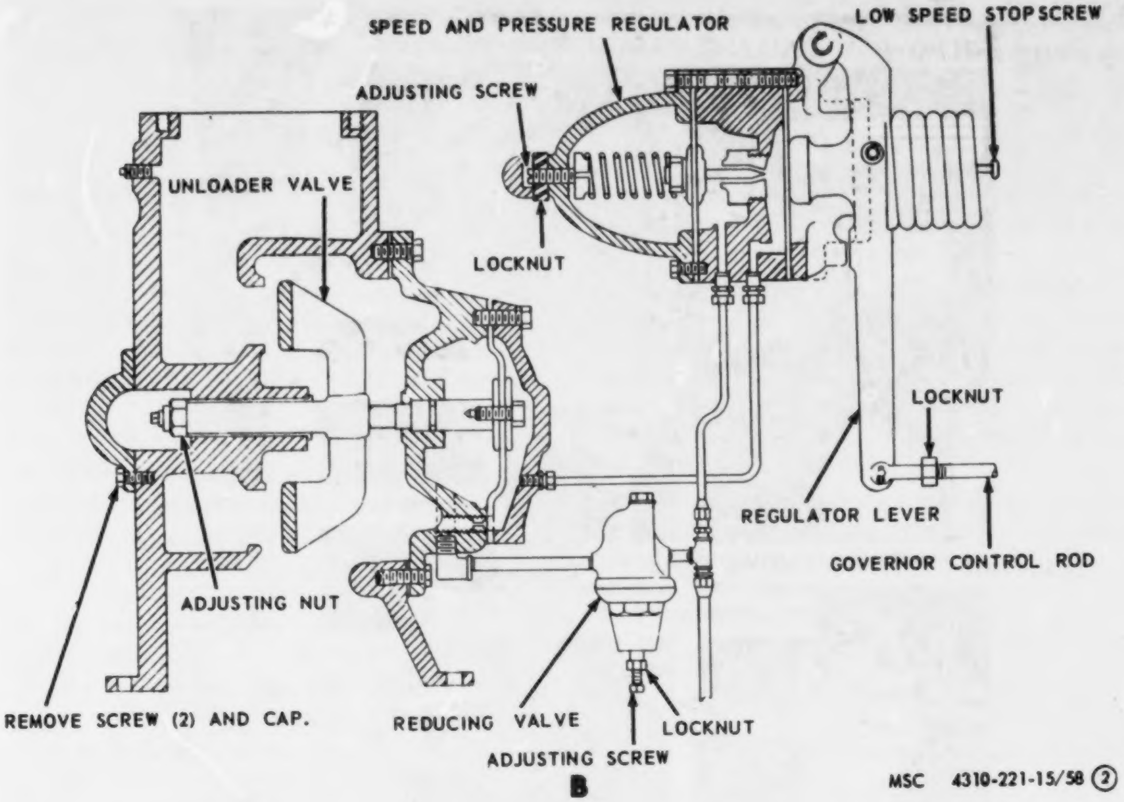
Figure 58. Speed and pressure regulator and reducing valve, removal, installation, and adjustment.

b. Cleaning and Inspection.

(1) Clean all parts with a cloth dampened in an approved cleaning solvent and dry thoroughly.

(2) Inspect hose coupling for cracks, breaks, and worn or missing O-rings. Replace defective hose couplings.

(3) Inspect minimum pressure valve for cracks, leaks, and other damage.


SPEED AND PRESSURE REGULATOR
LOW SPEED STOPSCREW
ADJUSTING SCREW
UNLOADER VALVE
LOCKNUT
LOCKNUT
REGULATOR LEVER
GOVERNOR CONTROL ROD
ADJUSTING NUT
REMOVE SCREW (2) AND CAP.
REDUCING VALVE
LOCKNUT
ADJUSTING SCREW
B
MSC 4310-221-15/58 ②

B—Regulator system adjustment
Figure 58—Continued.

(4) Inspect service valves for free operation. Replace all defective parts as necessary.

c. Installation. Install the service valves, hose coupling, and minimum pressure valve in reverse of the instructions on figure 59.

105. Safety Valve and Blowdown Valve

a. General. A safety valve is connected to the air receiver-oil separator tank to protect the compressor against any serious overpressure. Should the pressure in the tank rise above 125 psi, the valve will blow off air until the pressure drops back to 125 psi. The blowdown valve will automatically relieve the pressure in the receiver-separator when the unit is shut down.

b. Removal. Remove the safety and blowdown valves as instructed on figure 60.

c. Cleaning and Inspection.

(1) Clean the safety and blowdown valves with a cloth dampened in an approved cleaning solvent.

(2) Inspect the safety and blowdown valve for cracks, breaks, and proper operation. Operate the safety valve lever for free movement. Replace a defective safety valve or blowdown valve.

d. Installation. Install the safety and blowdown valves in reverse of the instructions on figure 60.

106. Hose Rack

a. Removal. Remove the hose rack as instructed on figure 61.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent.

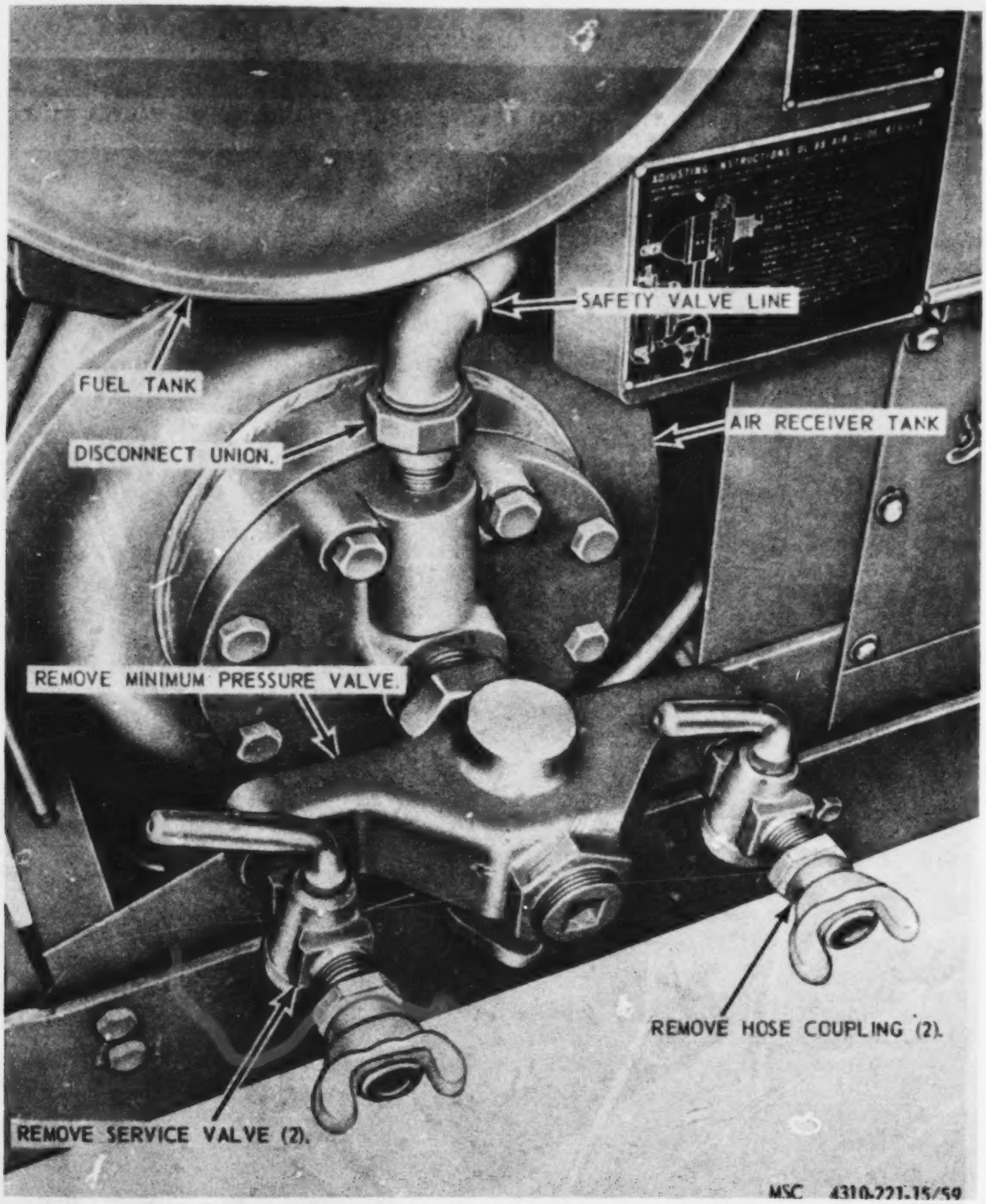

SAFETY VALVE LINE
FUEL TANK
AIR RECEIVER TANK
DISCONNECT UNION.
REMOVE MINIMUM PRESSURE VALVE.
REMOVE HOSE COUPLING (2).
REMOVE SERVICE VALVE (2).
MSC 4310-221-15/59

Figure 59. Service valves, hose couplings, and minimum pressure valve, removal and installation.

(2) Inspect the hose rack for bends, breaks, defective hardware, and other damage. Replace defective hose rack and mounting hardware.

c. Installation. Install the hose rack in reverse of the instructions on figure 61.

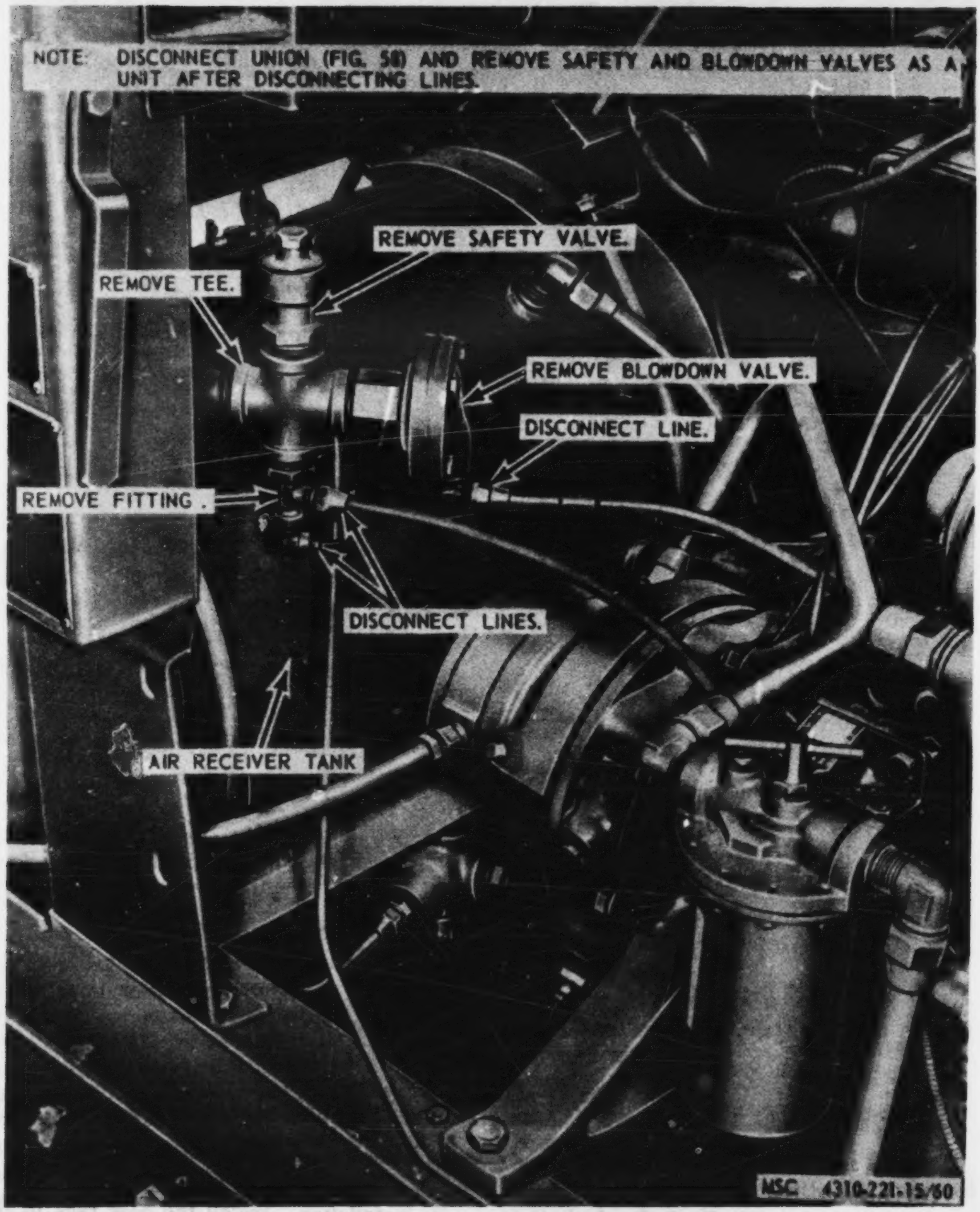

NOTE: DISCONNECT UNION (FIG. 58) AND REMOVE SAFETY AND BLOWDOWN VALVES AS A UNIT AFTER DISCONNECTING LINES.
REMOVE SAFETY VALVE.
REMOVE TEE.
REMOVE BLOWDOWN VALVE.
DISCONNECT LINE.
REMOVE FITTING.
DISCONNECT LINES.
AIR RECEIVER TANK
MSC 4310-221-15/60

Figure 60. Safety and blowdown valves, removal and installation.

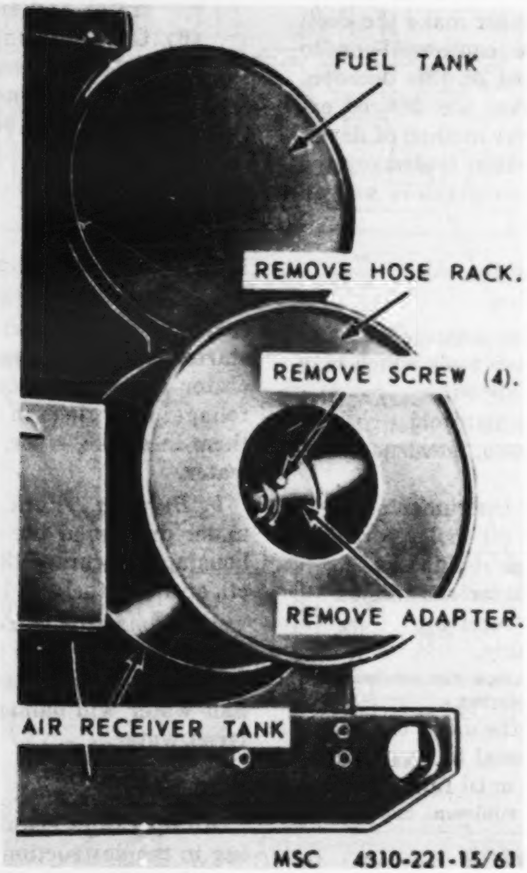

FUEL TANK
REMOVE HOSE RACK.
REMOVE SCREW (4).
REMOVE ADAPTER.
AIR RECEIVER TANK
MSC 4310-221-15/61

Figure 61. Hose rack, removal and installation.

CHAPTER 4
DEMOLITION OF THE AIR COMPRESSOR TO PREVENT ENEMY USE

107. General

When capture or abandonment of the air compressor to an enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or to render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all air compressors and all corresponding repair parts.

108. Demolition To Render the Air Compressor Inoperative

a. Mechanical Means. Use axe, sledge hammer, picks, or any other heavy tools which may be available to destroy the following:

(1) Cylinder block and manifold.
(2) Carburetor, magneto, governor, and air cleaner.
(3) Control panel and instruments.
(4) Radiator core and oil cooler core.
(5) Speed and pressure regulators.
(6) Generator and starter assemblies.
(7) Fuel tank and air receiver.
(8) Compressor assembly.

Note. The above steps are minimum requirements for this method.

b. Misuse. Add sand to the oil in the engine base and throw sand and metal fillings into the generator. Run the engine until failure occurs.

Note. The above steps are minimum requirements for this method.

109. Demolition by Explosives or Weapons Fire

a. Explosives. Place as many of the following charges (fig. 62) as the situation permits and detonate them simultaneously with detonating cord and a suitable detonator.

(1) Two ½-pound charges on right side of engine between the manifold.
(2) One ½-pound charge on magneto.
(3) One ½-pound charge on fuel pump.

Note. The above charges are the minimum requirements for this method.

(4) Two ½-pound charges on each side of the compressor.
(5) One ½-pound charge between generator and engine block.
(6) One ½-pound charge between water pump and engine block.
(7) One ½-pound charge between starter and engine block.

b. Weapons Fire. Fire on the air compressor assembly with the heaviest practical weapons available.

110. Other Demolition Methods

a. Scattering and Concealment. Remove all easily accessible parts such as the generator, starter, speed and pressure regulator, and generator regulator. Scatter them through dense foliage; bury them in dirt or sand; or submerge them in a lake, river, stream, or other body of water.

b. Burning. Pack rags, clothing, or canvas under or around the equipment and inside the housing. Saturate this packing with gasoline, oil, or diesel fuel and ignite.

c. Submersion. Totally submerge the air compressor assembly in a body of water to provide water damage and complete concealment. Salt water will damage metal parts more than fresh water.

111. Training

All operators should receive thorough training in the destruction of the air compressor assembly. Refer to FM 5–25. Simulated destruction, using all of the methods listed above, should be included in the operator training program. It must be emphasized in training, that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment and be able to carry out demolition instructions without reference to this or any other manual.

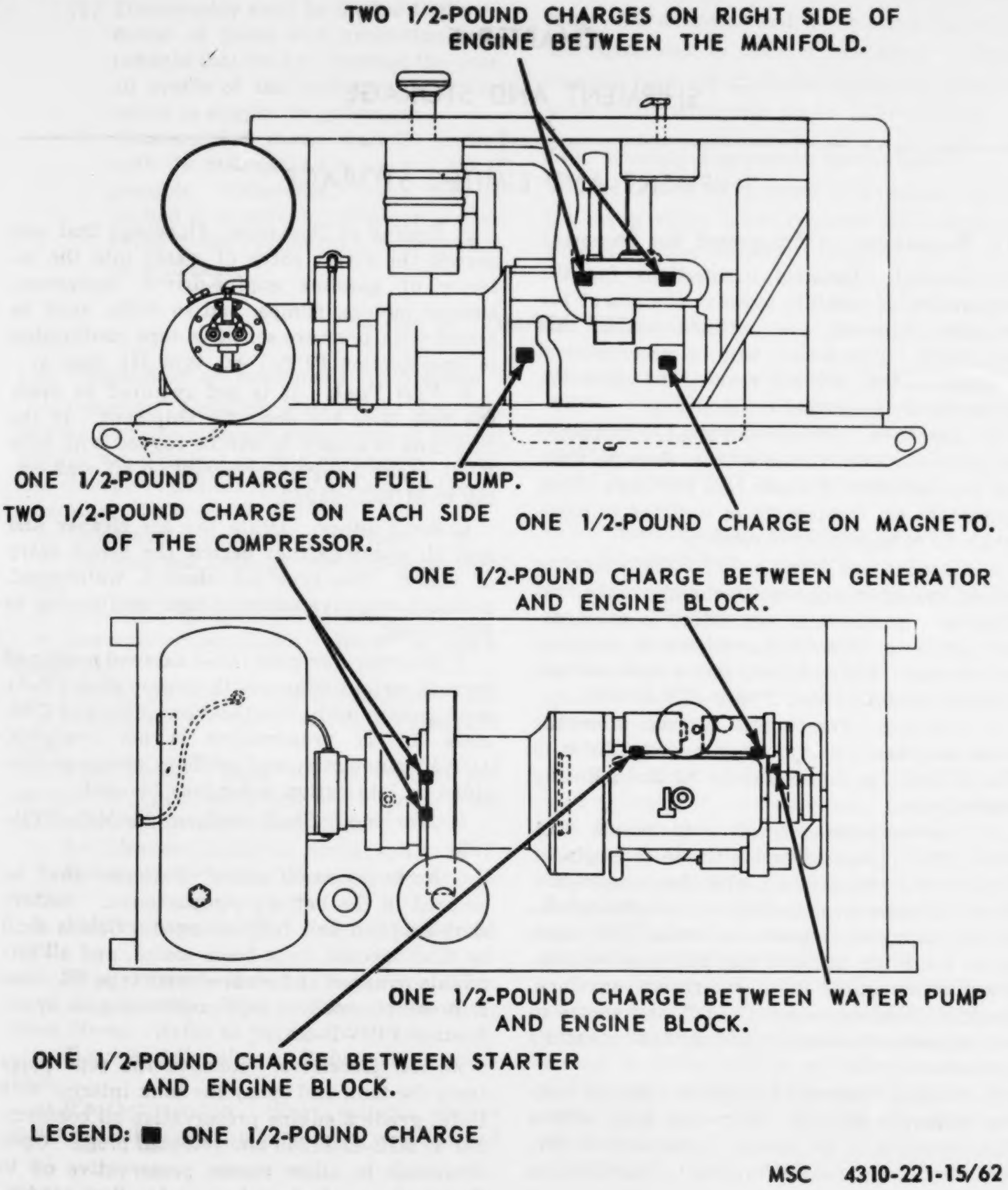

TWO 1/2-POUND CHARGES ON RIGHT SIDE OF ENGINE BETWEEN THE MANIFOLD.
ONE 1/2-POUND CHARGE ON FUEL PUMP.
TWO 1/2-POUND CHARGE ON EACH SIDE OF THE COMPRESSOR.
ONE 1/2-POUND CHARGE ON MAGNETO.
ONE 1/2-POUND CHARGE BETWEEN GENERATOR AND ENGINE BLOCK.
ONE 1/2-POUND CHARGE BETWEEN WATER PUMP AND ENGINE BLOCK.
ONE 1/2-POUND CHARGE BETWEEN STARTER AND ENGINE BLOCK.
LEGEND: ■ ONE 1/2-POUND CHARGE
MSC 4310-221-15/62

Figure 62. Placement of charges.

CHAPTER 5

SHIPMENT AND STORAGE

SHIPMENT AND LIMITED STORAGE

112. Preparation of Equipment for Shipment

a. General. Detailed instructions for the preparation of mobility support equipment for domestic shipment are outlined within this paragraph. Prevention will be accomplished in sequence that will not require the operation of previously preserved components.

b. Inspection. Compressor shall be inspected for any unusual condition such as damage, rusting, accumulation of water, and pilferage. Also, inspect the air compressor as outlined in paragraph 33 to assure serviceability.

c. Cleaning and Drying. Thorough cleaning and drying by an approved technique is the first essential procedure in any effective preservation process. Approved methods of cleaning and drying, types of preservatives, and methods of application are described in TM 38-230.

d. Painting. Painting all surfaces when the paint has been removed or damaged. Refer to TB ENG 60 for detailed cleaning and painting instructions.

e. Depreservation Guide. Annotate DA Form 2258 (Depreservation Guide of Engineer Equipment) concurrently with the preservation of the compressor. Outline any additional depreservation requirements in blocks 27 through 33 on DA Form 2258. Place the completed depreservation guide in a waterproof envelope, marked "Depreservation Guide", and secure in a conspicuous location on or near the operator's controls.

f. Cooling System. Determine that the cooling system is filled to the proper level with a clean solution of 50 percent water and 50 percent ethylene glycol conforming to Specification O-A-548, type 1.

Note. It is not necessary to drain and refill cooling system if the solution is clean and checks to a −25° F. If temperatures below −25° F. are expected, antifreeze conforming to Specification MIL-C-11755 shall be used in its undiluted condition.

g. Sealing of Openings. Openings that will permit the direct entry of water into the interior of gasoline engine-driven equipment, electric motors, pumps, and so forth, shall be sealed with pressure-sensitive tape conforming to Specification PPP-T-60, type III, class 1.

h. Fuel Tank. It is not required to drain the fuel tank for domestic shipment. If the fuel tank is empty, it will be fogged with type P-10, grade 2 engine preservation oil conforming to MIL-L-21260.

i. Air Cleaner. Drain the air cleaner and seal all openings that permit the direct entry of water. Use type III, class 1, waterproof, pressure-sensitive adhesive tape conforming to PPP-T-60.

j. Exterior Surfaces. Coat exposed machined ferrous metal surfaces with preservation (P-6) conforming with Specification MIL-C-11796, class 3. If preservative is not available, (GAA) automotive and artillery grease as specified on lubrication order may be used.

k. Marking. Shall conform to MIL-STD-129.

l. Batteries and Cables. Batteries shall be secured in the battery compartment. Battery shall be filled and fully charged. Cables shall be disconnected, vent holes sealed, and all terminals wrapped and secured with type III, class 1, pressure-sensitive tape conforming to Specification PPP-T-60.

m. Air Receivers. Remove the pipe plugs from the tank and spray the tank interior with P-10, grade 2 engine preservative oil conforming to MIL-L-21260 and reinstall plugs. Open draincock to allow excess preservative oil to drain. Leave draincock open to allow condensation to drain.

n. Shutter Assemblies and Side Covers. Close the radiator shutter assembly and fasten the side covers securely.

o. Disassembly, Disassembled Parts, Basic Issue Items.

(1) Disassembly shall be limited to the removal of parts and projecting components that tend to increase the overall profile of the equipment and that which is subject to pilferage.

(2) Disassembled items shall be packed with the publications in the tool box if possible. Otherwise, items will be packed in a suitable container and secured to the equipment to prevent loss or pilferage.

p. Hoses and Couplings. Recoil on hose reels, if so equipped, or coil the hose to a minimum safe diameter and tie or strap the coil to the equipment to prevent movement. Shroud exposed hose not protected by storage facilities with Kraft wrapping paper (UU–P–271).

113. Loading Equipment for Shipment

Load the air compressor in a manner similar to that in which it was received for domestic or zone-of-interior shipment (par. 6).

Section II. LIMITED STORAGE

114. Preparation of Equipment for Storage

a. General. Detailed instructions for preserving and maintaining equipment in limited storage are outlined in this paragraph. Limited storage is defined as storage not to exceed 6 months. Refer to AR 743–505.

b. Inspection. Refer to paragraph 112*b*.

c. Cleaning and Drying. Refer to paragraph 112*c*.

d. Painting. Refer to paragraph 112*d*.

e. Depreservation Guide. Refer to paragraph 112*e*.

f. Cooling System. Refer to paragraph 112*f*.

g. Sealing of Openings. Refer to paragraph 112*g*.

h. Fuel Tanks. Tank will be drained and sprayed or fogged with type P–10, grade 2 engine preservative oil, MIL–L–21260.

i. Air Cleaner. Refer to paragraph 112*i*.

j. Exterior Surfaces. Refer to paragraph 112*j*.

k. Batteries and Cables. Refer to paragraph 112*l*.

l. Air Receivers. Refer to paragraph 112*m*.

m. Disassembly, Disassembled Parts, Basic Issue Items. Refer to paragraph 112*o*.

n. Hoses and Couplings. Refer to paragraph 112*p*.

o. Weatherproofing. When suitable shelter is not available, select a firm, level, well-drained storage location protected from prevailing winds. Position the equipment on heavy planking or other solid surfaces. Cover the equipment with a tarpaulin or other suitable waterproof covering and tie down securely.

115. Inspection and Maintenance of Equipment in Storage

a. Inspection. When the air compressor has been placed in storage, all scheduled preventive maintenance services, including inspection, will be suspended and preventive maintenance inspection will be performed as specified herein. Refer to AR 743–505.

b. Worksheet and Preventive Maintenance. DA Form 2258 (Depreservation Guide of Engineer Equipment) and applicable forms listed in TM 38–750 shall be prepared for each major item of equipment when initially placed in limited storage and every 90 days thereafter. Perform required maintenance promptly to make sure equipment is mechanically sound and ready for immediate use.

c. Exercising. Service equipment in limited storage every 90 days in accordance with paragraphs 32 and 33. Operate equipment long enough to bring it up to operating temperature and insure complete lubrication of all bearings, gears, and the like. Represerve equipment after operation.

CHAPTER 6

FIELD AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

116. Scope

a. The following instructions are for field and depot maintenance personnel. They contain information on equipment maintenance that is beyond the scope of the tools, equipment, personnel, or supplies normally available to organizational maintenance

b. Appendix I includes the publications applicable to field and depot maintenance. Appendix II contains the maintenance allocation chart. The field and depot maintenance repair parts and special tool lists are listed in TM 5-4310-221-35P.

117. Record and Report Forms

For record and report forms applicable to field and depot maintenance, refer to TM 38-750.

Note. Applicable forms, excluding standard Form 46 which is carried by the operator, shall be kept in a canvas bag mounted on the equipment.

Section II. DESCRIPTION AND DATA

118. Description

For a complete description of the air compressor, see paragraph 3.

119. Field and Depot Maintenance Tabulated Data

a. General. This paragraph contains all the overhaul data pertinent to field and depot maintenance personnel.

b. Nut and Bolt Torque Data.

Cylinder-head stud nuts	70–75 ft-lb
Main bearing caps	85–95 ft-lb
Connecting rod bearing caps	35–40 ft-lb
Flywheel	35–40 ft-lb
Gear cover	25–30 ft-lb
Front end plate	15–20 ft-lb
Oil pan	15–20 ft-lb
Flywheel housing	50–55 ft-lb

c. Time Standards. Table II lists the number of man-hours required under normal conditions to perform the indicated maintenance and repair for the air compressor. The man-hours listed are not intended to be rigid standards. Under adverse conditions, the operations will take longer; but under ideal conditions with highly skilled mechanics, most of the operations can be accomplished in considerably less time.

Table II. Time Standards

Lubrication and Service

		Man/Hours
01	Engine	
0100	Engine Assemly	
	Engine, gasoline (to drain and refill the crankcase to proper level.)	0.4
0108	Engine Lubrication System	
	Filter, oil (to remove element, clean housing, install new element.)	0.3
03	Fuel System	
0302	Fuel Pumps	
	Pump, fuel (to clean bowl.)	0.2
0304	Air Cleaner	
	Cleaner, air (to clean air cleaner cup, replenish with fresh oil, clean cap.)	0.3
0306	Tanks, Lines, Fittings	
	Tank, fuel (to replenish fuel.)	0.6
0309	Fuel Filters	
	Filter, fuel (to remove element, clean bowl, install new gasket.)	0.3
05	Cooling System	
0501	Radiator	
	Radiator (to drain, flush, and refill cooling system.)	1.1

		Man/Hours
06	Electrical System	
0603	Starter	
	Starter (to remove starter, oil wicks, and replace.)	0.8
0604	Ignition Components	
	Spark plugs (to clean, inspect, adjust.)	0.9
0612	Batteries	
	Batteries (to replenish water.)	0.3
47	Gages and Measuring Devices	
4701	Instrument, Speed	
	Adapter, tachometer (to fill cup with grease.)	0.2
50	Pneumatic Equipment	
5000	Air Compressor Assembly	
	Compressor assembly (to drain and refill oil system.)	0.9
5006	Lubrication System	
	Compressor, oil (to turn cleaning handle.)	0.01
	(to remove, clean, install with new gasket.)	0.6
5014	Air Receiver	
	Tank, oil separator (to drain condensation.)	0.2
76	Fire Fighting Equipment	
7603	Fire Extinguishers	
	Extinguisher, fire (to clean and check.)	0.2
	Removal and Replacement	
01	Engine	
0100	Engine Assembly	
	Engine, gasoline (includes removal and installation of hood, radiator, and compressor.)	7.3
0101	Crankcase, Cylinder Head	
	Crankcase (includes removal and installation of engine and compressor assembly, and disassembly and reassembly of engine.)	22.8
	Clyinder head (includes removal and installation of spark plugs, hose, thermostat, oil filter bracket, sending unit, and overspeed governor.)	3.7
0102	Crankshaft	
	Crankshaft (includes removal and installation of engine and compressor assembly, oil pan, oil pump, pulley, timing gear cover, flywheel, housing, bearings, and seals.)	13.8
	Bearings, sleeves; seals (includes removal and installation of engine and compressor assembly, oil pan, oil pump, pulley, and timing gear cover.)	12.7
	Pulley (includes removal and installation of hood, radiator, hoses, and belt.)	5.8
0103	Flywheel Assembly	
	Flywheel; ring gear; housing (includes removal and installation of engine and compressor assembly, starter, air regulator bracket.)	11.9
0104	Pistons, Connecting Rods	
	Pistons; rings; pins; retainers; bearings and sleeve (includes removal and installation of engine, cylinder head, oil pan, and oil pump.)	15.3
	Rods, connecting (includes removal and installation of engine, cylinder head, oil pan, oil pump, pistons, and pins.)	14.9
0105	Valves, Camshafts, and Timing System	
	Inserts, seat; guides, valve stem (includes removal and installation of hood, hose, overspeed governor, oil filter bracket, valve side cover, locks, springs, and valves.)	7.6
	Valves; locks; springs (includes removal and installation of hood, hose, overspeed governor, oil filter bracket, and valve side cover.)	6.7
	Lifters, valve (includes removal and installation of hood, hose, overspeed governor, oil filter bracket, valve side cover, locks, springs, valves, and cylinder head.)	7.2
	Camshaft; washer, thrust; bearings, sleeve; gears, timing (includes removal and installation of hood, radiator, hoses, pulley, governor, magneto, fuel pump, overspeed governor, oil filter bracket, cylinder head, valve side cover, locks, springs, valves, timing gear cover, and valve lifters.)	14.6
	Cover, timing gear (includes removal and installation of hood, radiator, hoses, pulley, belt, governor, and magneto.)	7.1
0108	Engine Lubrication System	
	Pump assembly, oil; pan, oil (includes removal and installation of engine, hood, radiator hoses, and compressor.)	9.3

Table II. Time Standards—Continued

		Man/Hours
	Valve, oil pressure relief (includes removal and installation of side panel and cables.)	0.8
	Cap, oil fill; gage, oil level (includes removal and installation of side cover.)	0.1
	Filter, oil (includes removal and installation of hoses and fittings.)	1.4
	Fittings; hoses, oil (includes removal and installation of side cover.)	0.9
0110	Manifolds	
	Manifolds (includes removal and installation of pipe and carburetor.)	1.9
03	Fuel System	
0301	Carburetor	
	Carburetor (includes removal and installation of line, air intake hose, choke and throttle controls.)	1.6
	Gasket, bowl (includes removal and installation of side panel, air intake hose.)	1.1
0302	Fuel Pumps	
	Pump, fuel (includes removal and installation of hose, fittings, line.)	1.0
0304	Air Cleaner	
	Cleaner, air (includes removal and installa-of brackets, hose.)	0.8
0306	Tanks, Lines, Fittings	
	Tank, fuel (includes removal and installation of lines, fittings, straps, transmitter filler cap.)	2.2
	Saddle; lining; strip (includes removal and installation of lines, fittings, straps, tank.)	2.8
	Lines (includes removal and installation of clamp.)	1.1
	Transmitter; cap, filler (includes removal and installation of wire.)	0.8
	Strainer (includes removal and installation of cap, chain.)	0.5
0308	Engine Speed Governor	
	Governor (includes removal and installation of linkage.)	1.1
	Rod, control	0.4
0309	Fuel Filters	
	Strainer, fuel; bowl; filter assembly (includes removal and installation of lines, fittings.)	0.6
0312	Accelerator, Throttle or Choke Controls	
	Cable, speed; wire; choke; rod (includes removal and installation of clamp.)	0.9
04	Exhaust System	
0401	Muffler and Pipes	
	Muffler; cap; pipe (includes removal and installation of clamp.)	1.1
05	Cooling System	
0501	Radiator	
	Core, radiator (includes removal and installation of hood, lower and upper cover assembly, guard, hoses, cap, fittings, shroud, fan guard, oil cooler.)	5.2
	Guard	0.6
	Supports (includes removal and installation of fan guards.)	0.9
	Cap, radiator	0.01
0502	Deflector, Shroud, Etc.	
	Shrouds (includes removal and installation of fan guard, supports.)	1.2
	Wings	0.4
0503	Lines and Fittings, Hoses, Pipes, Clamps, Etc.	
	Clamps, hoses, radiator	0.6
	Cock, drain; fittings, elbow inlet (includes removal and installation of lines, hoses.)	0.4
0504	Water Pump	
	Pump, water (includes removal and installation of fan guards, shroud, belt, fan, hose, pipe, fittings.)	3.8
0505	Fan Assembly	
	Belt, V (includes removal and installation of fan guard.)	1.1
	Fan (includes removal and installation of belt, fan guards, shroud.)	1.9
	Guards (includes removal and installation of supports.)	0.9
0506	Thermostats and Gaskets, Etc.	
	Thermostat (includes removal and installation of hose, pipe, inlet eblow).	0.6
06	Electrical System	
0601	Generator	
	Generator (includes removal and installation of wiring.)	1.2
	Brushes	2.2

Table II. Time Standards—Continued

		Man/Hours
	(includes removal and installation of wiring, generator, cover.)	
0602	Generator Regulator	
	Regulator, voltage (includes removal and installation of wiring.)	0.8
0603	Starter	
	Starter (includes removal and installation of cables, solenoid starter switch.)	1.3
	Brushes (includes removal and installation of starter.)	1.9
	Switch, solenoid (includes removal and installation of cables, starter.)	1.5
	Wiring	1.1
0604	Ignition Components	
	Magneto (includes removal and installation of side plate, cables, wire.)	1.5
	Points; condenser (includes removal and installation of magneto, housing.)	2.3
	Spark plugs (includes removal and installation of cables.)	0.4
	Cables, spark plug (includes removal and installation of side plate.)	0.6
0606	Engine Safety Controls	
	Governor, overspeed (includes removal and installation of wiring.)	0.4
	Wire assembly	0.2
	Switch, temperature (includes removal and installation of wiring.)	0.3
0607	Instrument or Engine Control Panel	
	Ammeter; switches; light (includes removal and installation of wiring, brackets.)	2.3
	Panel, instrument (includes removal and installation of switches, light, ammeter, wiring, drive cable.)	2.5
	Wiring	0.9
	Bracket	0.3
	Lamp (includes removal and installation of cap.)	0.1
0608	Miscellaneous Items	
	Receptacle (includes removal and installation of cables.)	0.6
	Harness, wiring; cable (includes removal and installation of receptacle.)	1.9
0612	Batteries	
	Batteries (includes removal and installation of cober, cables, holddowns.)	0.8
	Cable, battery (includes removal and installation of cover.)	0.5
	Box, battery (includes removal and installation of cover, holddowns, cables, batteries.)	1.2
	Cover	0.2
15	Frame	
1501	Frame Assembly	
	Frame (includes removal and installation of engine and compressor assembly, hood, panels, housing, radiator, cooler, lines, fuel tank, air tank, toolbox, lifting bail, frame pans, runners.)	18.7
	Pan, frame	3.1
	Bail, lifting (includes removal and installation of hood, cover plates.)	3.4
	Runner, skid (includes removal and installation of battery box, side sheets, cables, oil drain hose, fuel tank, air tank.)	14.1
17	Body; Hood	
1703	Doors and Panels	
	Covers; plate, housing; supports; housing, radiator panel (includes removal and installation of muffler cap, cover plates, voltage, regulator, mounting plate.)	3.9
1708	Stowage Racks; Boxes	
	Rack, hose	0.8
	Box, tool	0.6
22	Accessory Items	
2210	Data Plates	
	Plates, data	1.2
	Plates, instruction	0.4
26	Accessories, Publications, and Tools	
2602	Accessories	
	Accessories, unmounted	0.01
2603	Common Tools	
	Tools, common	0.01
2605	Publications	
	Publications	0.01
47	Gages and Measuring Devices	
4701	Instrument, Speed	
	Tachometer (includes removal and installation of cable.)	0.8
	Adapter, tachometer (includes removal and installation of overspeed governor.)	0.7

Table II. Time Standards—Continued

		Man/Hours
4702	Gages, Mounting, Lines and Fittings	
	Gages (includes removal and installation of tubing, wiring.)	0.8
	Fitting (includes removal and installation of tubing.)	0.4
	Tubing (includes removal and installation of clamps.)	0.3
	Indicator, oil temperature; gage, pressure; dial indicating, oil level	1.3
50	Pneumatic Equipment	
5000	Air Compressor Assembly	
	Compressor assembly (includes removal and installation of hood, radiator, cooler, engine and compressor assembly.)	9.2
5001	Cylinder	
	Cylinders (includes removal and installation of engine and compressor assembly, hood, radiator, cooler, lines, wiring, compressor, housing, rotor, vane set.)	15.7
5004	Rotors	
	Rotor shaft; bearings; seal; vanes (includes removal and installation of engine and compressor assembly, hood, radiator, cooler, lines, compressor, housing, cylinder.)	16.2
5006	Lubrication System	
	Valve assembly, bypass (includes removal and installation of engine and compressor assembly, hood, radiator, cooler, lines, wiring, oil pump.)	4.6
	Pump, oil (includes removal and installation of engine and compressor assembly, hood, radiator, cooler, lines, wiring, oil pump.)	9.6
	Bracket, filter mounting (includes removal of lines and fittings.)	1.8
	Cooler, oil (includes removal and installation of upper and lower cover assembly, guard, housings, oil lines, fittings.)	5.6
	Valves, bypass, oil (includes removal and installation of sump assembly.)	1.3
	Tubes (includes removal and installation of clamp.)	0.5
	Filter assembly, compressor oil (includes removal and installation of tubing.)	0.8
5007	Compressor Drive	
	Gears (includes removal and installation of hood, radiator, cooler, lines, wiring, compressor and engine assembly, split compressor from engine.)	9.8
5008	Air Intake	
	Elbow, bracket assembly (includes removal and installation of filter assembly, hoses, clamps.)	1.9
	Bracket, filter (includes removal and installation of clamps, hose, air cleaner assembly.)	1.7
	Manifold, inlet (includes removal and installation of clamps, hoses.)	0.9
	Air inlet hose; clamps	0.3
5009	Unloader System Components	
	Unloader assembly (includes removal and installation of engine and compressor assembly, compressor, radiator, cooler, hood, wiring, lines.)	9.4
	Valve, regulating (includes removal and installation of lines, fittings.)	1.4
	Cock; fittings (includes removal and installation of lines.)	0.4
	Lines	0.2
	Valve, safety	0.3
	Valve, blowdown (includes removal and installation of line, fitting.)	0.5
	Cover (includes removal and installation of lines, fittings, pipe.)	1.3
	Filter assembly (includes removal and installation of lines, pipe, cover.)	2.4
	Valve, relief (includes removal and installation of compressor oil filter assembly and bracket, lines, fittings.)	2.8
5012	Throttling Devices	
	Regulator assembly, air (includes removal and installation of lines, fittings, rod.)	1.3
5014	Air Receiver	
	Tank, oil separator (includes removal and installation of fuel tank, lines, straps,	7.8

Table II. Time Standards—Continued

	Man/Hours
saddles, fittings, pipes, cap, gage.)	
Valve, globe (includes removal and installation of cover.)	0.5
5015 Air Discharge System	
Valve assembly, check (includes removal and installation of tube, wires, fitting, switch.)	4.7
Valves	0.8
Coupling, hose	0.3
76 Fire Fighting Equipment	
7603 Fire Extinguishers	
Extinguisher, fire	0.05

d. Engine and Compressor Repair and Replacement Standards. Table III lists manufacturer's sizes, tolerances, desired clearances, maximum allowable wear, and maximum allowable clearances.

Table III. Engine and Compressor Repair and Replacement Standards

	Manufacturer's dimensions and tolerances in inches		Desired clearance		Maximum allowable wear	Maximum allowable clearance
	Minimum	Maximum	Minimum	Maximum		
Cylinders						
Bore	3.4375	3.4395	------	------	0.008	
Taper	------	------	------	------	0.008	
Out-of-round	------	------	------	------	0.004	
Crankshaft						
Main journal od	2.249	2.250	------	------	0.001	
Main bearing id	2.250	2.251	------	------	0.001	
Main bearing thickness	0.0929	0.0931	------	------	0.0005	
Main bearing clearance	------	------	0.001	0.002	------	0.005
Rod journal od	2.0600	2.0607	------	------	0.0005	
End play	0.004	0.006	------	------	0.002	
Connecting Rods						
Rod bearing id	2.0615	2.0620	------	------	0.001	
Rod bearing thickness	0.0623	0.0628	------	------	0.0005	
Rod bearing length	1.057	1.067				
Rod bearing clearance	------	------	0.001	0.002	------	0.003
Side play	------	------	0.006	0.010	------	0.020
Bushing length	1.170	1.190				
Bushing od	0.9175	0.9195				
Bushing id	0.8593	0.8596	------	------	0.0005	
Bushing thickness	0.0345	0.0365				
Bushing clearance	------	------	0.0003	0.0005	------	0.0010
Pistons						
Skirt dia	3.4365	3.4385	------	------	0.0005	
Land dia	3.4045	3.4095	------	------	0.005	
Length	3.490	3.510				
Groove dia	3.042	3.052				
Top groove width	0.096	0.097	------	------	0.003	
2nd groove width	0.0955	0.0965	------	------	0.003	
3d and 4th groove width	0.1565	0.1575	------	------	0.003	
Pin hole id	0.8593	0.8596	------	------	0.0005	
Clearance in cylinder 5–10 lb-pull with 0.003 feeler gage						
Piston Pins						
Length	2.738	2.753				
Diameter	0.8591	0.8593	------	------	0.0002	
Fit in piston	------	------	0.0001	0.0003	------	0.0005
Fit in bushing	------	------	0.0003	0.0005	------	0.0010
Rings						
Top compression:						
Width	0.162	0.172	------	------	0.002	
Thickness	0.093	0.094	------	------	0.005	
Gap	------	------	0.010	0.020	------	0.040
Clearance in groove	------	------	0.002	0.004	------	0.008

Table III. Engine and Compressor Repair and Replacement Standards—Continued

	Manufacturer's dimensions and tolerances in inches		Desired clearance		Maximum allowable wear	Maximum allowable clearance
	Minimum	Maximum	Minimum	Maximum		
Intermediate compression:						
Width	0.143	0.153	------	------	0.002	
Thickness	0.093	0.094	------	------	0.005	
Gap	------	------	0.010	0.020	------	0.040
Clearance in groove	------	------	0.002	0.004	------	0.008
Oil control:						
Width	0.137	0.147	------	------	0.002	
Thickness	0.1545	0.1555	------	------	0.004	
Gap	------	------	0.010	0.020	------	0.040
Clearance in groove	------	------	0.001	0.003	------	0.006
Face of Cylinder Head, Warpage						
Lengthwise	------	------	------	------	0.006	
Crosswise	------	------	------	------	0.004	
Camshaft						
Journals od:						
1	1.8715	1.8725	------	------	0.002	
2	1.7455	1.7465	------	------	0.002	
3	1.2465	1.2475	------	------	0.002	
Bearings id:						
1	1.8745	1.8755	------	------	0.002	
2	1.7495	1.7505	------	------	0.002	
3	1.2495	1.2505	------	------	0.002	
Clearance	------	------	0.002	0.004	------	0.008
End play	------	------	0.005	0.009	------	0.020
Timing Gears						
Backlash	------	------	0.002	0.004	------	0.010
Valves						
Intake:						
Length	5.0945	5.1095	------	------	0.030	
Head dia	1.460	1.480				
Face angle	45°					
Stem dia	0.3405	0.3415	------	------	0.002	
Clearance in guide	------	------	0.001	0.003	------	0.005
Exhaust:						
Length	5.0945	5.1095	------	------	0.030	
Head dia	1.270	1.290				
Face angle	45°					
Stem dia	0.3405	0.3415	------	------	0.002	
Clearance in guide	------	------	0.003	0.005	------	0.006
Valve Guides						
Od	0.6565	0.6575				
Id	0.3422	0.3432	------	------	0.002	
Distance block-to-guide	1 15/32					
Valve Springs						
Valve open:						
Length	1 27/64					
Load	96–104 lb					
Valve closed:						
Length	1 40/64					
Load	47–53 lb					
Flywheel						
Flange runout	------	------	------	------	0.008	
Face runout	------	------	------	------	0.008	
Oil Pump						
Gear backlash	------	------	0.002	0.004	------	0.008
Gear end play	------	------	0.001	0.003	------	0.005
Gear clearance	------	------	0.0015	0.006	------	0.010

Table III. Engine and Compressor Repair and Replacement Standards—Continued

	Manufacturer's dimensions and tolerances in inches		Desired clearance		Maximum allowable wear	Maximum allowable clearance
	Minimum	Maximum	Minimum	Maximum		
Water Pump						
Diameter of shaft	0.500					
Id of bushing clearance between impeller and pump body	------	0.035				
With spring compressed to 1 in. scale should read 3 lb						
Fan						
Diameter of shaft	0.500					
Id of bushing	0.503					
Runout of pulley	------	0.010				
Low presure vane:						
Length	------	------	------	------	0.010	
Thickness	------	------	------	------	0.003	
Width	------	------	------	------	0.015	
High pressure vane:						
Length	------	------	------	------	0.005	
Thickness	------	------	------	------	0.003	
Width	------	------	------	------	0.015	
Low pressure cylinder:						
Broach radius	------	------	------	------	0.010	
Cylinder radius	------	------	------	------	0.010	
High pressure cylinder:						
Broach radius	------	------	------	------	0.010	
Cylinder radius	------	------	------	------	0.010	
Low pressure rotor:						
Slot width	------	------	------	------	0.015	
High pressure rotor:						
Slot width	------	------	------	------	0.015	
Cylinder outer plate thickness	------	------	------	------	0.006	
Cylinder inner plate thickness	------	------	------	------	0.006	
Unloader valve bushing bore	------	------	------	------	0.0025	
Unloader valve stem diameter	------	------	------	------	0.0025	
High pressure discharge check-valve stem diameter	------	------	------	------	0.005	
High pressure discharge check-valve body valve stem bore	------	------	------	------	0.005	

Section III. SPECIAL TOOLS AND EQUIPMENT

120. Special and Specially Designed Tools and Equipment

No special tools, specially designed tools or equipment is required to perform field and depot maintenance on the air compressor.

121. Field and Depot Maintenance Repair Parts

The field and depot maintenance repair parts are listed and illustrated in TM 5-4310-221-35P.

Section IV. TROUBLESHOOTING

122. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the compressor or any of its components. Each trouble symptom stated is followed by a list of probable causes of trouble. The possible remedy recommended is described opposite the probable cause.

123. Engine Fails To Start or Is Hard To Start

Probable cause	*Possible remedy*
Defective magneto	Repair magneto (par. 141).
Compression low	Repair or replace valves (par. 147).
Worn or broken piston rings.	Replace defective piston rings (par. 157).

124. Engine Lacks Power

Probable cause	*Possible remedy*
Defective magneto	Repair magneto (par. 141).
Defective valves	Repair or replace valves (par. 147).

125. Engine Stops Suddenly

Probable cause	*Possible remedy*
Defective magneto	Repair magneto (par. 141).
Compressor rotor locked	Repair rotor (pars. 179, 181).
Safety device actuated	Determine cause before starting engine.

126. Improper Oil Pressure

Probable cause	*Possible remedy*
Worn main bearings	Replace main bearings (par. 161).
Worn connecting rod bearings.	Replace connecting rod bearings (par. 157).
Worn camshaft bearings	Replace camshaft bearings (par. 163).
Defective oil pump	Replace oil pump (par. 155).

127. Improper Generator Charging Rate

Probable cause	*Possible remedy*
Defective generator commutator.	Repair commutator (par. 139).
Field coils open or shorted	Replace field and frame assembly (par. 139).

128. Engine Knocks

Probable cause	*Possible remedy*
Defective main bearings	Replace main bearings (par. 161).
Defective pistons and pins	Replace pistons and pins (par. 157).
Worn or defective valve lifters.	Replace valve lifters (par. 147).

129. Engine Overheats

Probable cause	*Possible remedy*
Defective water pump	Replace water pump (par. 78).
Defective radiator	Repair or replace radiator (par. 143).

130. Engine Backfires

Probable cause	*Possible remedy*
Defective valves	Repair or replace valves (par. 147).
Defective valve lifter	Replace valve lifter (par. 147).
Defective magneto	Repair magneto (par. 141).

131. Excessive Smoke From Exhaust

Probable cause	*Possible remedy*
Worn piston rings	Replace piston rings (par. 157).
Defective carburetor	Replace carburetor (par. 59).

132. Compressor Overheats

Probable cause	*Possible remedy*
Defective oil pump	Repair or replace oil pump (par. 177).
Compressor oil passages clogged.	Clean oil passages (par. 177).
Defective rotor bearings and vanes.	Replace or repair bearings and vanes (pars. 179–181).

133. Compressor Fails To Build Up Pressure

Probable cause	*Possible remedy*
Defective rotor vanes	Replace vanes (pars. 179–181).
Defective pressure regulator.	Repair pressure regulator (par. 167).
Air receiver leaking	Repair or replace air receiver (par. 176).

134. Metallic Noise in Air Compressor

Probable cause	*Possible remedy*
Broken rotor vanes	Replace vanes (pars. 179–181).
Defective rotor bearings	Replace rotor bearings (pars. 179–181).
Defective drive gears	Replace drive gears (pars. 179–181).

Section V. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS OR AUXILIARIES

135. General

To perform any major overhaul or repair of the internal parts of either the engine or compressor, it is necessary to remove both the engine and compressor from the frame as an assembly.

136. Engine and Compressor

a. Removal.

(1) Remove the shutters and guard (par. 57).

(2) Remove the side covers, top cover, and side sheets (par. 57).

(3) Remove the lifting bail (par. 57).

(4) Remove the radiator and oil cooler assembly (par. 143).

(5) Remove instrument control panel (par. 14).

(6) Disconnect the battery cables from the starter motor (par. 65).

(7) Remove the overspeed governor and tachometer drive (par. 84).

(8) Remove the governor control linkage (par. 95).

(9) Remove fuel lines from tank to engine carburetor (pars. 59, 60, and 61).

(10) Remove the compressor oil filter (par. 98).

(11) Disconnect air interstage sending unit (par. 81).

(12) Disconnect oil temperature bypass (par. 99).

(13) Remove the air cleaner and air inlet elbow from the compressor (par. 63).

(14) Remove the reducing valve (par. 103).

(15) Remove the speed and pressure regulator and mounting bracket from flywheel housing (par. 101).

(16) Disconnect air discharge pressure gage sending switch and air line (par. 81).

(17) Remove the high pressure discharge check valve as instructed on figure 63.

Note. On serial No. range 125CR22346 through 125CR22545 oil does not have to be drained before removing engine.

(18) Remove the engine and compressor assembly as instructed on figure 64.

(19) Remove the compressor from the engine as instructed on figure 65.

b. Cleaning, Inspection, and Repair.

(1) Clean the engine and compressor with an approved cleaning solvent and dry thoroughly.

(2) Inspect the engine and compressor housing for cracks, breaks, or other damage. Weld as required.

(3) Inspect all mounting hardware, brackets, bearings, and gears for excessive wear or damage.

(4) Inspect all covers and gaskets for leaks. Replace covers and gaskets as required.

(5) Inspect overall condition of engine and compressor painted surfaces; inspect for loose paint, rust, or corrosion. Scrape off rust and repaint as required.

(6) Inspect air discharge check valve for breaks, cracks, and other damage.

c. Installation.

(1) Install the engine to the compressor in reverse of the instructions on figure 65.

(2) Install the engine and compressor assembly in reverse of the instructions on figure 64.

(3) Install the high pressure discharge check valve in reverse of the instructions on figure 63.

(4) Connect the air discharge pressure gage sending switch and air line (par. 81).

(5) Install fuel lines to tank and engine carburetor (pars. 59, 60, and 61).

(6) Install the governor control linkage (par. 95).

(7) Install the tachometer drive and overspeed governor (par. 84).

(8) Install the speed and pressure regulator and mounting bracket to the flywheel housing (par. 101).

(9) Install the air cleaner and air inlet elbow to the compressor (par. 63).

(10) Connect the air interstage sending unit (par. 81).

(11) Connect the oil temperature bypass valve (par. 99).

(12) Install the compressor oil filter (par. 98).

(13) Install the reducing valve (par. 103).

(14) Connect the battery cable to the starter motor (par. 65).

(15) Install the instrument control panel (par. 14).

(16) Install the radiator and oil cooler assembly (par. 143).

(17) Install the lifting bail (par. 57).

(18) Install the side covers, top cover, and side sheets (par. 57).

(19) Install the shutters and guard (par. 57).

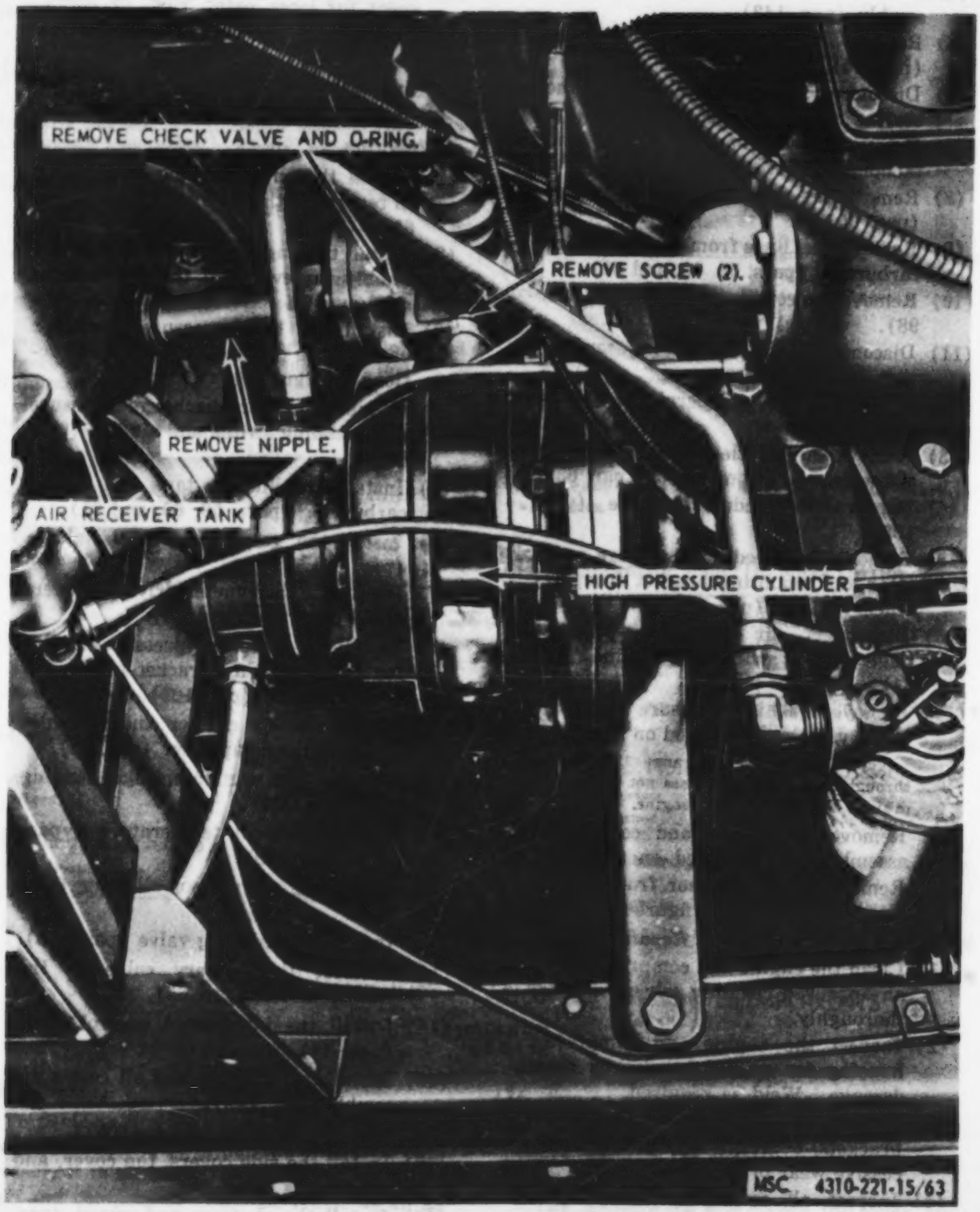
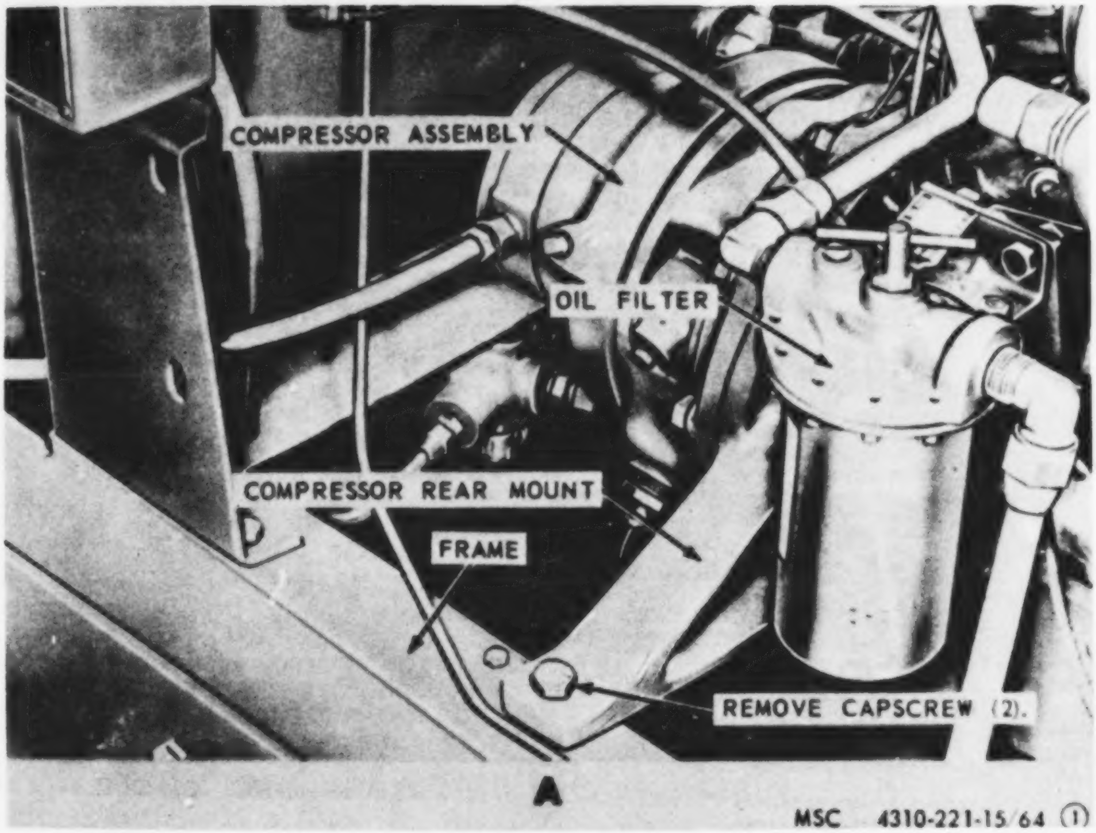
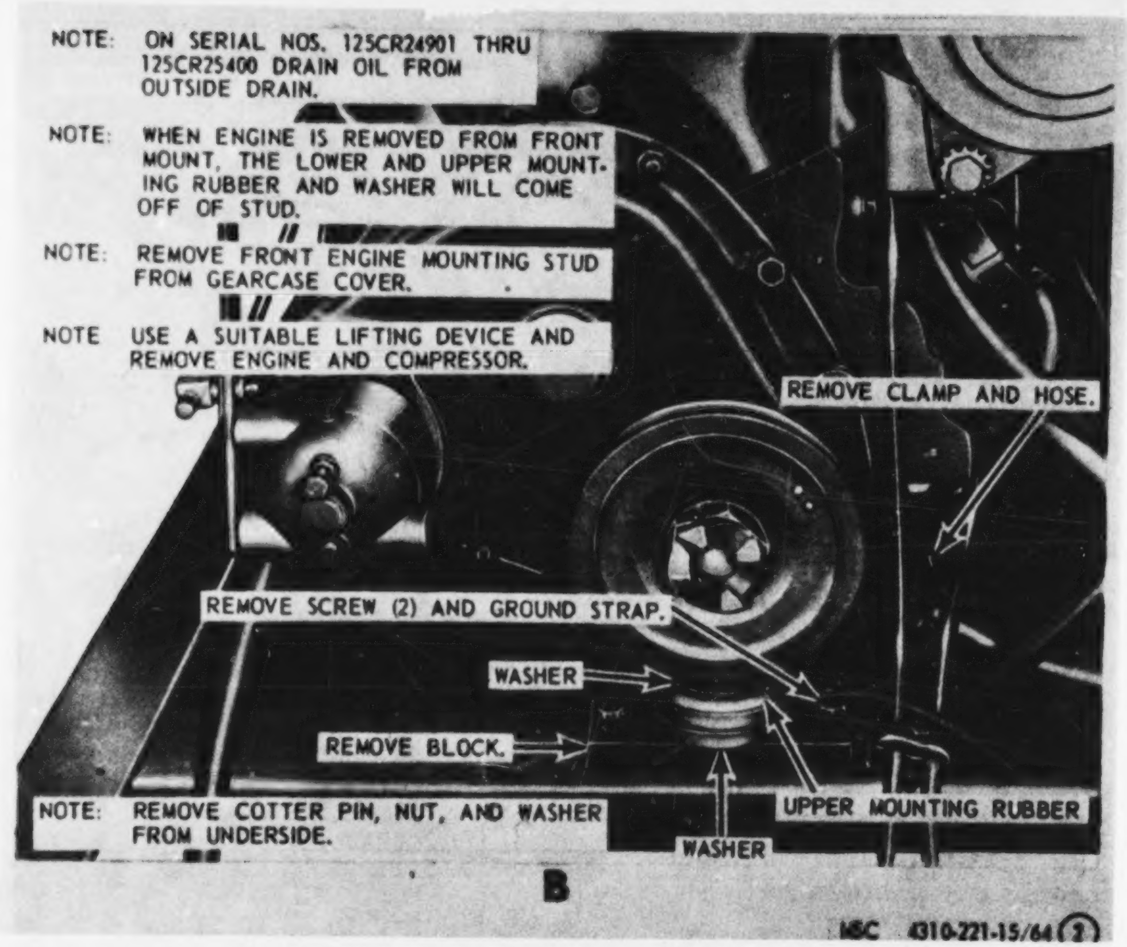

REMOVE CHECK VALVE AND O-RING.
REMOVE SCREW (2).
REMOVE NIPPLE.
AIR RECEIVER TANK
HIGH PRESSURE CYLINDER
MSC 4310-221-15/63

Figure 63. High pressure discharge check valve, removal and installation.


COMPRESSOR ASSEMBLY
OIL FILTER
COMPRESSOR REAR MOUNT
FRAME
REMOVE CAPSCREW (2).
A
MSC 4310-221-15/64 ①

A—Compressor, rear mount

Figure 64. Engine and compressor, removal and installation.



NOTE: ON SERIAL NOS. 125CR24901 THRU 125CR25400 DRAIN OIL FROM OUTSIDE DRAIN.

NOTE: WHEN ENGINE IS REMOVED FROM FRONT MOUNT, THE LOWER AND UPPER MOUNTING RUBBER AND WASHER WILL COME OFF OF STUD.

NOTE: REMOVE FRONT ENGINE MOUNTING STUD FROM GEARCASE COVER.

NOTE USE A SUITABLE LIFTING DEVICE AND REMOVE ENGINE AND COMPRESSOR.

REMOVE CLAMP AND HOSE.

REMOVE SCREW (2) AND GROUND STRAP.

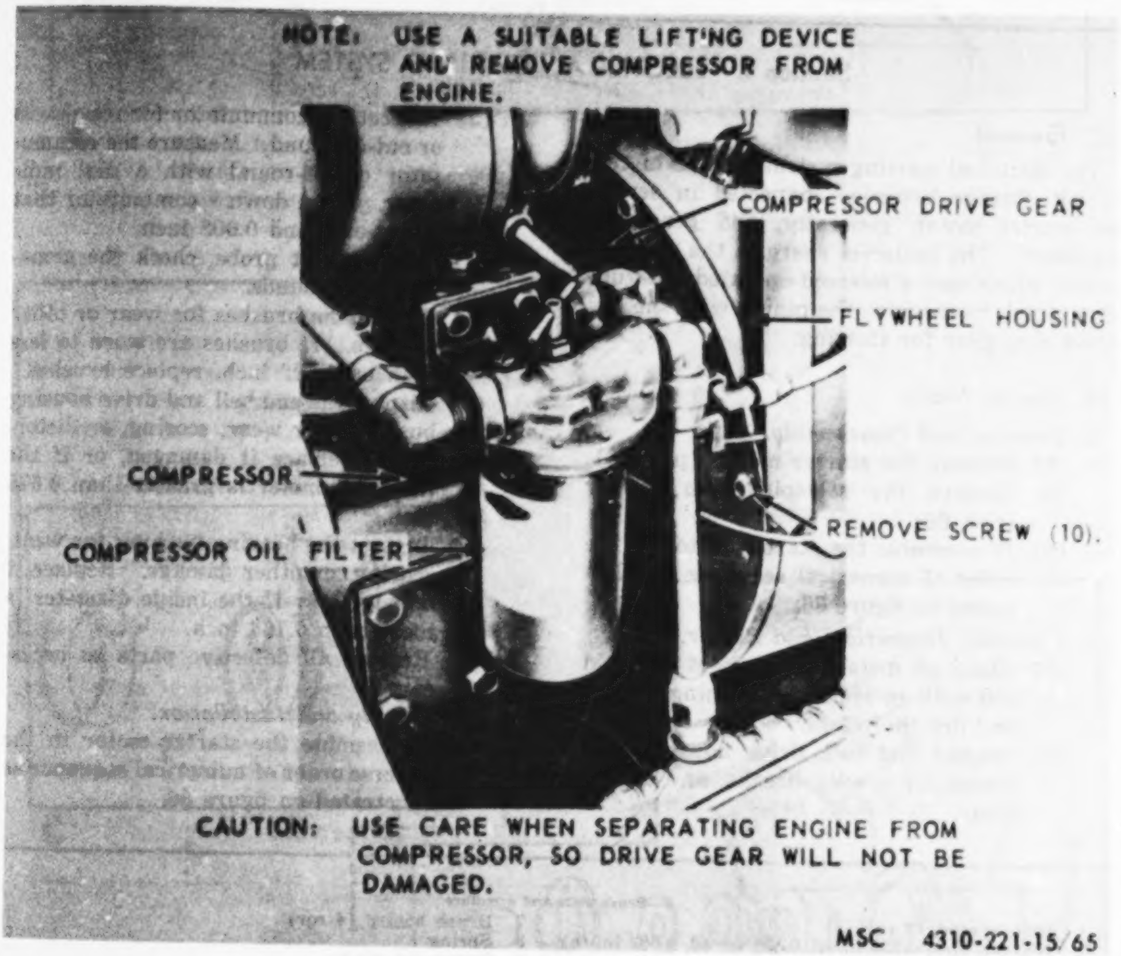
REMOVE BLOCK.

NOTE: REMOVE COTTER PIN, NUT, AND WASHER FROM UNDERSIDE.

WASHER
UPPER MOUNTING RUBBER
WASHER
B
NSC 4310-221-15/64 (2)

B—Engine, front mount

Figure 64—Continued.



NOTE: USE A SUITABLE LIFTING DEVICE AND REMOVE COMPRESSOR FROM ENGINE.

CAUTION: USE CARE WHEN SEPARATING ENGINE FROM COMPRESSOR, SO DRIVE GEAR WILL NOT BE DAMAGED.

COMPRESSOR DRIVE GEAR
FLYWHEEL HOUSING
COMPRESSOR
REMOVE SCREW (10).
COMPRESSOR OIL FILTER
MSC 4310-221-15/65

Figure 65. Compressor and engine separation.

CHAPTER 7

ENGINE AND COMPRESSOR REPAIR INSTRUCTIONS

Section I. ELECTRICAL STARTING SYSTEM

137. General

The electrical starting system consists of two 12-volt storage batteries connected in series, the starter motor, generator, and generator regulator. The batteries energize the starting motor, which uses a solenoid-operated overrunning clutch to energize the pinion with the flywheel ring gear for starting.

138. Starter Motor

a. Removal and Disassembly.

(1) Remove the starter motor (par. 66).

(2) Remove the solenoid from starter (par. 66).

(3) Disassemble the starter motor in the order of numerical sequence as illustrated on figure 66.

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts except the field coil with an approved cleaning solvent and dry thoroughly.

(2) Inspect end bell, drive housing, and frame for cracks, breaks, and distortion.

(3) Inspect the commutator for roughness or out-of-round. Measure the commutator out-of-round with a dial indicator. Turn down a commutator that is out-of-round 0.003 inch.

(4) Using a test probe, check the armature for grounds.

(5) Inspect the brushes for wear or other damage. If brushes are worn to less than one-half inch, replace brushes.

(6) Inspect the end bell and drive housing bushings for wear, scoring, or distortion. Replace if damaged, or if the inside diameter is greater than 0.570 inch.

(7) Inspect the bearing bushing for wear, scoring, or other damage. Replace if damaged, or if the inside diameter is more than 0.764 inch.

(8) Replace all defective parts as necessary.

c. Reassembly and Installation.

(1) Reassemble the starter motor in the reverse order of numerical sequence as illustrated on figure 66.

A—Brush plate and armature

1	Bolt, special (2 rqr)	7	Brush holder (4 rqr)
2	Washer, lock, 0.255 in. id, 0.493 in. od, 0.062 in. thk (2 rqr)	8	Spring
3	End bell	9	Expansion plug
4	Screw, 6–32 x ½ in. (4 rqr)	10	Bushing
5	Washer, lock, No. 6 (4 rqr)	11	Armature
6	Brush (4 rqr)	12	Washer, flat, 9/16 in.

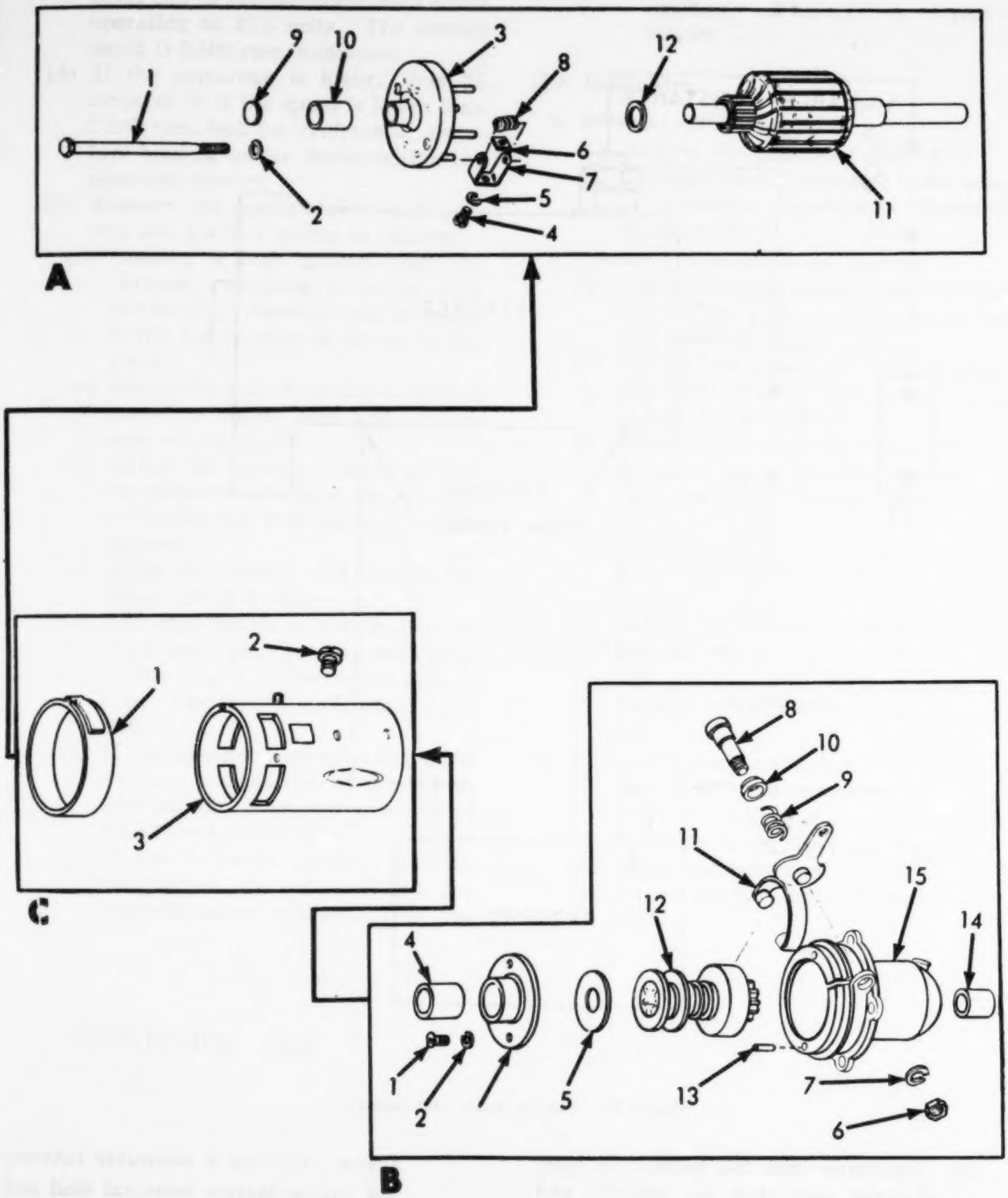
B—Drive end assembly

1	Screw, No. 10–32 x 7/16 in. (4 rqr)	9	Spring
2	Washer, lock, No. 10 (4 rqr)	10	Support
3	Center bearing housing	11	Shift lever
4	Bushing	12	Drive assembly
5	Washer, nonmetallic	13	Dowel pin, ⅛ x ⅜ in.
6	Nut, ⅜–24	14	Bushing
7	Washer, lock, ⅜ in.	15	Drive housing
8	Shaft, stud		

C—Frame assembly

1	Cover	2	Pole screw, ⅜–24 x ⅝ in. (4 rqr)	3	Field and frame assembly

Figure 66. Starter motor—exploded view.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A
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3
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14
4
1
2
5
13
7
6
B

MSC 4310-221-15/66

Figure 66—Continued.

(2) Install the solenoid to the starter (par. 66).

(3) Install the starter motor (par. 66).

d. *Testing.*

(1) Test the starter as illustrated on figure 67.

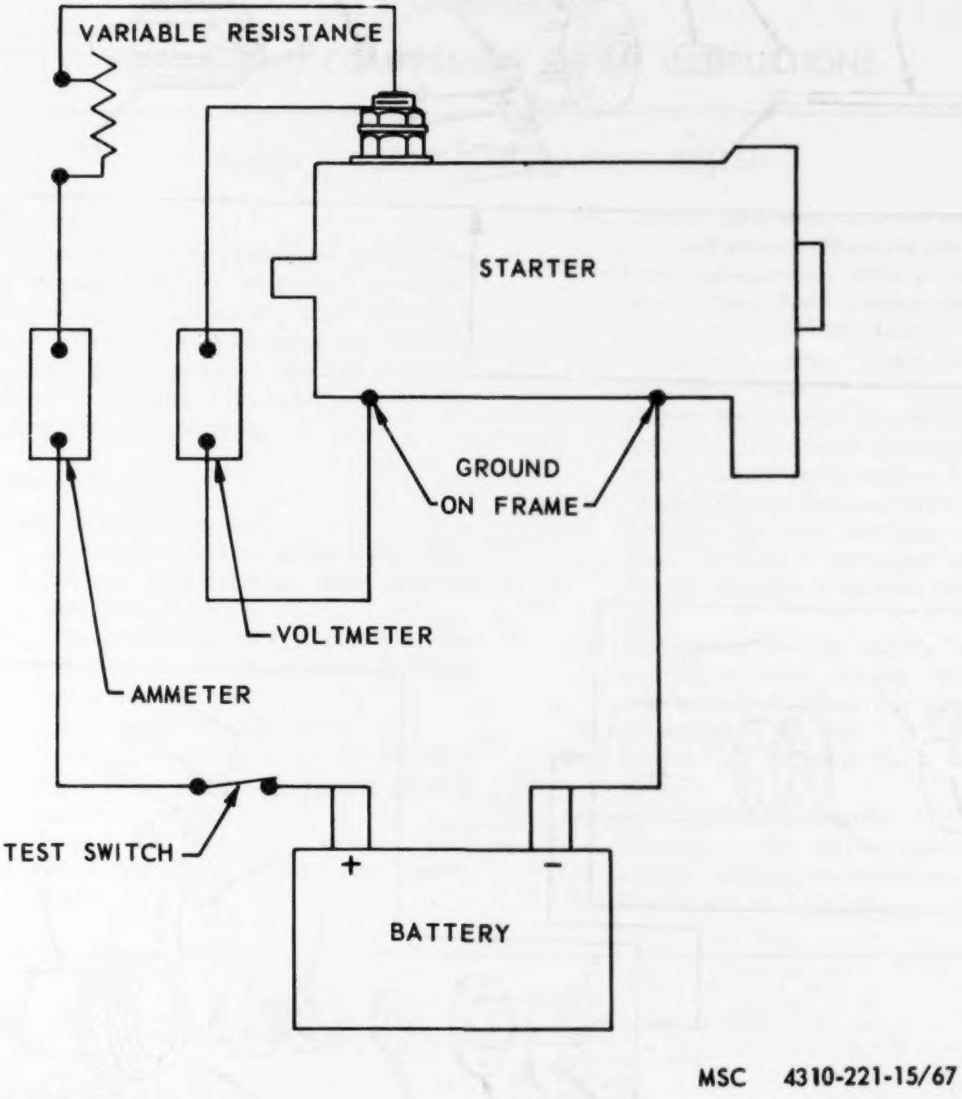

VARIABLE RESISTANCE
STARTER
GROUND ON FRAME
VOLTMETER
AMMETER
TEST SWITCH
+
−
BATTERY
MSC 4310-221-15/67

Figure 67. Starter motor test hookup.

(2) Determine that the battery is fully charged and that all battery and starter cables are serviceable and properly installed.

(3) Connect a 300-ampere ammeter, a carbon pile rheostat, and a 24-volt battery in a series with the engine starter terminal stud and the starter frame. Connect a voltmeter between the engine starter terminal stud and the starter frame, as shown on figure 67.

(4) Adjust the voltage to 23.5 volts and read the ammeter. The correct reading is 35 amperes, maximum.

(5) Hold a hand tachometer against the drive end of the armature shaft while operating at 23.5 volts. The correct speed is 2,500 rpm, minimum.

(6) If the amperage is higher than 35 amperes or if the speed is lower than 2,500 rpm, look for evidence of armature binding or for shorts within the electrical starter.

(7) Measure the engine starter stall current and the lock torque as follows:

(*a*) Connect a high current carrying variable resistance in series with the battery, rheostat, and ammeter in the test current as shown on figure 67.

(*b*) Clamp the engine starter down and mount a torque arm and tension gage on the starter.

(*c*) Adjust the armature shunt so that the ammeter will have the capacity to handle the stall current of 265 amperes.

(*d*) Close the circuit and adjust the voltage to 19.1 volts.

(*e*) The stall torque is the product of the tension gage reading multiplied by the length of the torque arm in feet. The correct stall torque is 19 ft-lb.

(*f*) If the ammeter reading is above 265 amperes and the stall torque is low, look for shorts or improper assembly of the engine starter.

(*g*) If the ammeter reading and the stall torque are both low, look for high-resistance connections at the field windings, armature, or brushes. Repair a defective starter.

139. Generator

a. Removal and Disassembly.

(1) Remove the generator (par. 67).

(2) Disassemble the generator in the order of numerical sequence as illustrated on figure 68.

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts except the field coil with an approved cleaning solvent and dry thoroughly.

(2) Inspect the drive end plate, housing, and commutator end plate for cracks, breaks, or distortion.

(3) Inspect the commutator segments for excessive wear, pitting, burning, or discoloration. Inspect commutator for out-of-round.

(4) Using a suitable tester, test the armature windings for open circuits and shorts.

(5) Inspect the brushes for wear or other damage. If brushes are worn to less than one-half inch, replace brushes.

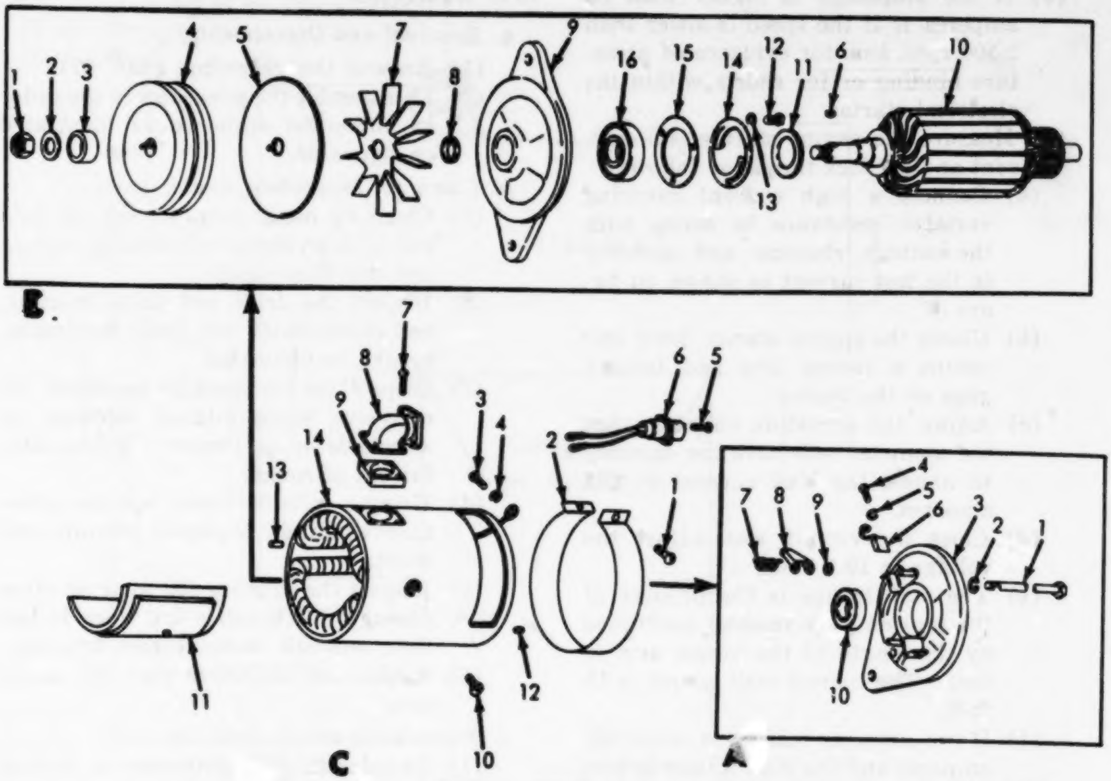
(6) Replace all defective parts as necessary.

c. Reassembly and Installation.

(1) Reassemble the generator in reverse order of numerical sequence as illutrated on figure 68.

(2) Install the generator (par. 67).

(3) Adjust the generator drive belt (par. 67).



NOTE: REMOVE ITEMS (3) AND (4) ON "C" BEFORE ITEM (3) ON "A".

MSC 4310-221-15/68

A—Generator end plate assembly

1	Bolt, 5/16–18 x 8 in. (2 rqr)
2	Washer, lock, 5/16 in. (2 rqr)
3	Brush end plate
4	Screw, 6–32 x ¼ in. (2 rqr)
5	Washer, lock, No. 6 (2 rqr)
6	Brush (2 rqr)
7	Brush spring (2 rqr)
8	Brush arm (2 rqr)
9	Washer, flat, 3/16 in. (2 rqr)
10	Bearing

B—Armature and drive end housing assembly

1	Nut, ½–13
2	Washer, flat, ½ in.
3	Spacer
4	Pulley
5	Baffle
6	Woodruff key, No. 5
7	Fan
8	Spacer
9	Drive end plate
10	Armature
11	Spacer
12	Screw assembly, 10–24 x ⅜ in.
13	Washer, lock, No. 10 (3 rqr)
14	Collector ring
15	Bearing retainer
16	Drive end plate bearing

C—Field and frame assembly

1	Screw, 10–24 x 1¼ in.
2	Cover band
3	Screw, 8–32 x ⅜ in.
4	Washer, lock, No. 8
5	Screw assembly, No. 6–32 x ⅜ in. (4 rqr)
6	Connector plug
7	Screw assembly, 10–32 x 1 in. (4 rqr)
8	Connector
9	Block
10	Pole screw, special (2 rqr)
11	Pole shoe (2 rqr)
12	Dowel pin, ⅛ x ⅜ in.
13	Dowel pin, ⅛ x ⅜ in.
14	Field and frame assembly

Figure 68. Generator assembly—exploded view.

Section II. IGNITION SYSTEM

140. General

The ignition system consists of the spark plugs, magneto, cables, and ignition switch. The magneto is driven by an impulse coupling and is mounted on the timing gearcase. It supplies high tension current to the spark plugs to fire the fuel-air mixture in the combustion chambers.

141. Magneto

a. Removal and Disassembly.

(1) Remove the magneto (par. 72).

(2) Disassemble the magneto in the order of numerical sequence as illustrated on figure 69.

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts of the magneto with an approved cleaning solvent and dry thoroughly.

(2) Inspect rotor and gears for damaged threads and teeth. Inspect all other parts for burrs, cracks, broken leads, and other damage.

(3) Inspect housing and end cap for cracks, breaks, and distortion. Replace all defective parts as necessary.

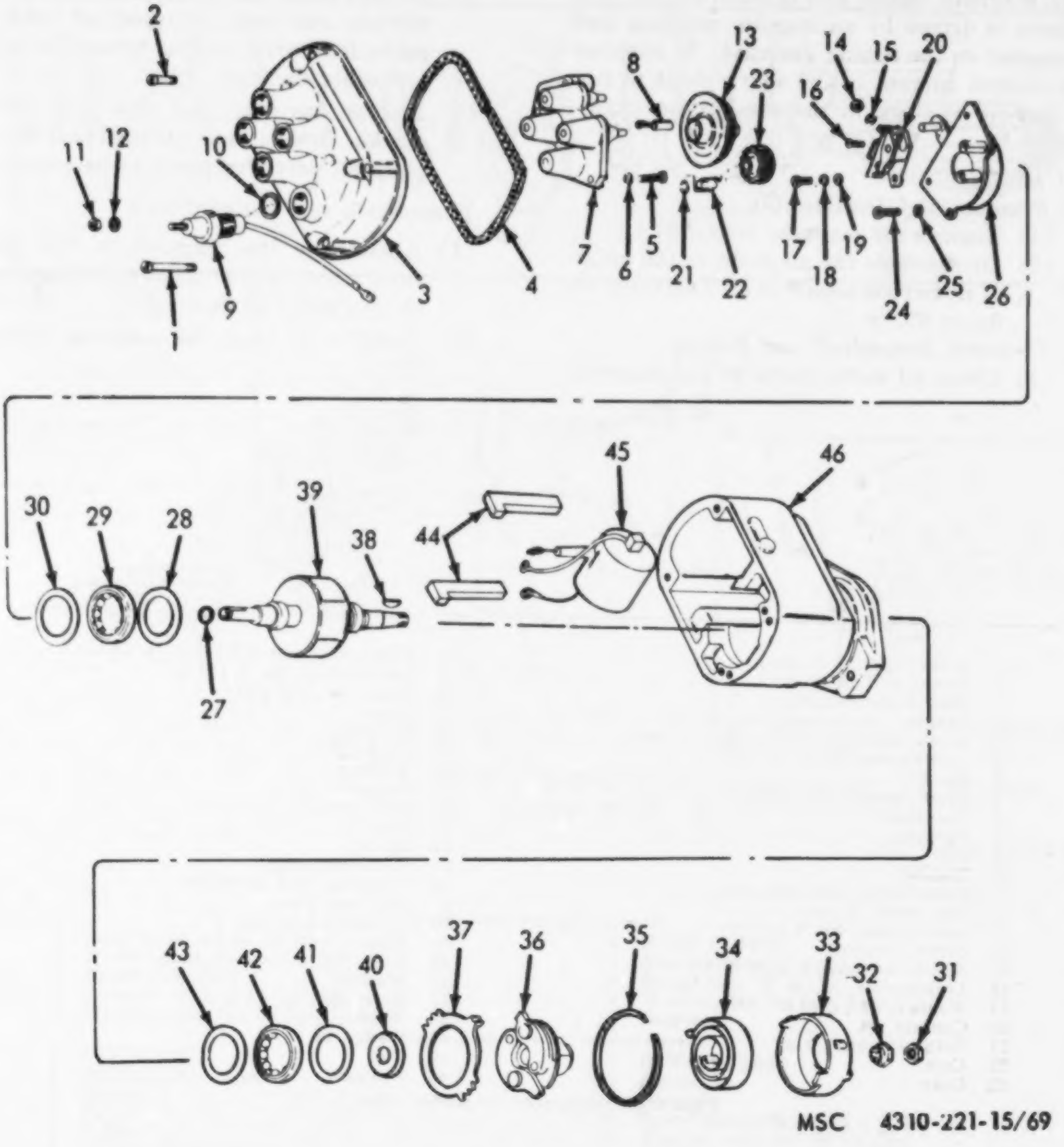
c. Reassembly and Installation.

(1) Reassemble the magneto in the reverse order of the numerical sequence as illustrated on figure 69.

(2) Install and time the magneto (par. 72).

1	Screw, special (2 rqr)
2	Screw, special (2 rqr)
3	Distributor housing
4	Gasket
5	Screw, machine, 8–32 x ⅜ in. (3 rqr)
6	Lockwasher, No. 8 (3 rqr)
7	Block
8	Brush assembly (5 rqr)
9	Condenser
10	Packing
11	Nut
12	Washer
13	Distributor, disk and gear
14	Nut, 8–32 (2 rqr)
15	Lockwasher, No. 8 (2 rqr)
16	Screw, support
17	Screw, machine, 8–32 x ⅜ in.
18	Lockwasher, No. 8
19	Washer, flat, No. 8
20	Contact set
21	Retaining snap ring
22	Cam
23	Gear
24	Screw, machine, 8–32 x 9/16 in. (4 rqr)
25	Lockwasher, No. 8 (4 rqr)
26	Rotor bearing plate
27	Shim
28	Washer
29	Bearing
30	Washer
31	Palnut
32	Nut, special
33	Shell
34	Spring
35	Retaining ring
36	Coupling, hub assembly
37	Stop pin plate
38	Woodruff key, No. 3
39	Rotor
40	Seal
41	Washer
42	Bearing
43	Washer
44	Wedge (2 rqr)
45	Coil
46	Frame

Figure 69. Magneto—exploded view.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MSC 4310-221-15/69

Figure 69—Continued.

Section III. COOLING SYSTEM

142. General

The cooling system consists of radiator, fan, water pump, thermostat, and oil cooler. The radiator and oil cooler consists of two separate heat-transfer core sections. The oil cooler is mounted in front of the radiator. As the compressor oil and engine coolant flow through the cores, air is drawn through the cores by the engine fan and cools the liquids.

143. Radiator and Oil Cooler

a. *Removal and Disassembly.*

(1) Remove shutters and guards (par. 57).

(2) Remove the engine side covers, top cover, and side sheets (par. 57).

(3) Disconnect the radiator hoses (par. 75).

(4) Remove fan shroud and fan guard (par. 76).

(5) Remove the radiator and oil cooler as an assembly as instructed on figure 70.

b. *Cleaning, Inspection, and Repair.*

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect radiator core for holes, cracks, breaks, or damaged core sections. Repair or replace a damaged radiator core.

(3) Inspect the oil cooler for holes, cracks, breaks, or damaged core sections. Repair or replace a defective oil cooler.

(4) Inspect radiator and oil cooler top cover for breaks, cracks, or other damage. Replace a defective top cover.

(5) Inspect all radiator and oil cooler lines and hose connections for signs of leakage or broken connections. Replace as necessary.

c. *Reassembly, Testing, and Installation.*

(1) Test radiator by installing test plugs in the radiator inlet, outlet, and overflow openings.

(2) Install a suitable test adapter in the radiator cap outlet and connect an air hose to the adapter. Submerge the radiator in a test tank of water and apply approximately 8 to 10 pounds of air pressure.

(3) If leaks exist, they will be indicated by bubbles in the water.

(4) Remove radiator from test tank and solder leaks as necessary.

(5) Test and repair the oil cooler in a similar manner.

(6) Install the radiator and oil cooler in reverse of the instructions on figure 70.

(7) Install the shroud and guard (par. 76).

(8) Connect radiator hoses (par. 75).

(9) Install the top cover, side sheets, and side covers (par. 57).

(10) Install shutters and guards (par. 57).

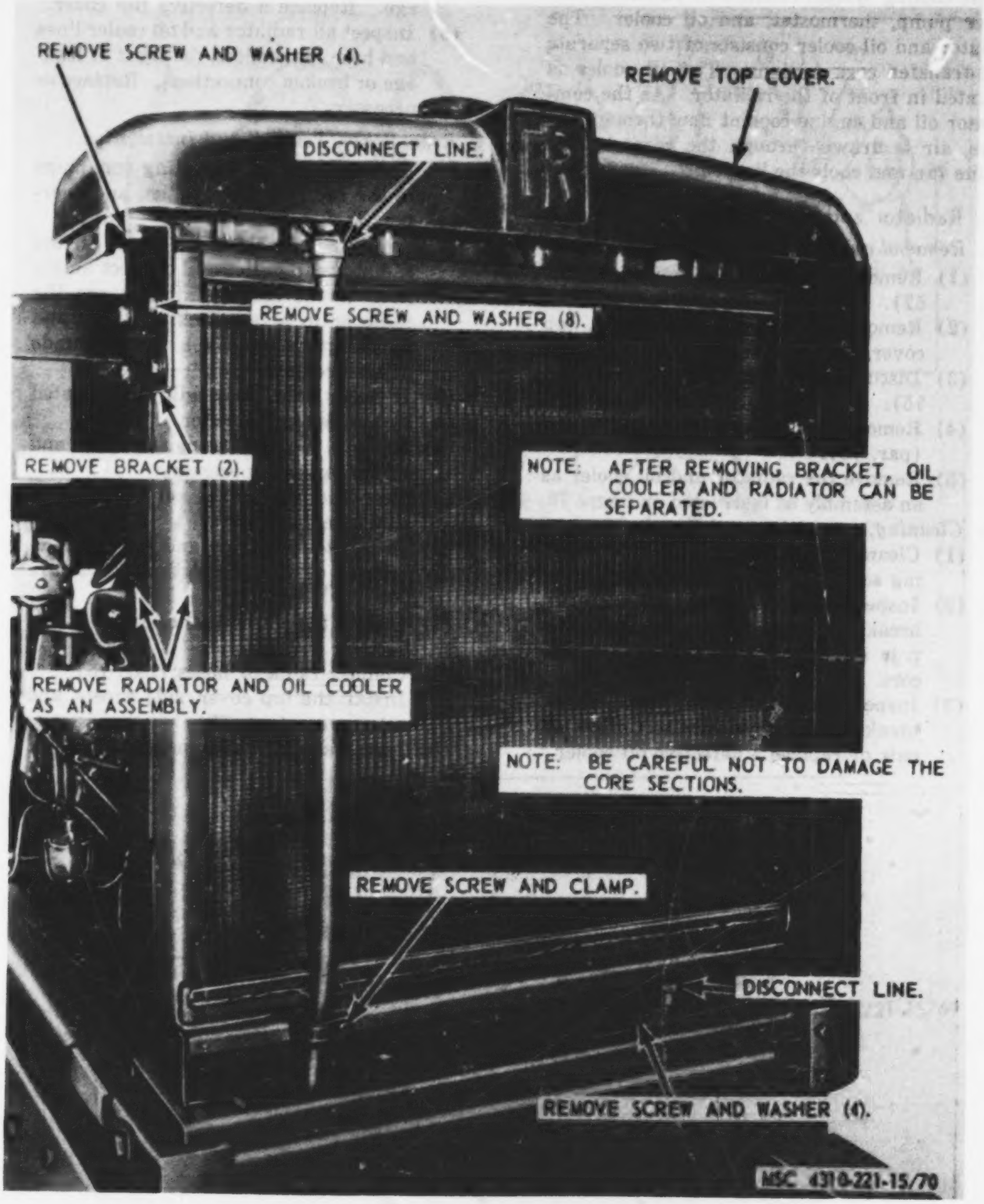

REMOVE SCREW AND WASHER (4).
REMOVE TOP COVER.
DISCONNECT LINE.
REMOVE SCREW AND WASHER (8).
REMOVE BRACKET (2).
NOTE: AFTER REMOVING BRACKET, OIL COOLER AND RADIATOR CAN BE SEPARATED.
REMOVE RADIATOR AND OIL COOLER AS AN ASSEMBLY.
NOTE: BE CAREFUL NOT TO DAMAGE THE CORE SECTIONS.
REMOVE SCREW AND CLAMP.
DISCONNECT LINE.
REMOVE SCREW AND WASHER (4).
MSC 4310-221-15/70

Figure 70. Radiator and oil cooler, removal and installation.

Section IV. ENGINE SAFETY CONTROL

144. General

The safety device system consists of the engine overspeed governor, engine oil pressure shutdown switch, engine water temperature shutdown switch, and compressor air discharge temperature shutdown and safety valve.

145. Engine Overspeed Governor

a. Removal and Disassembly.

(1) Remove the overspeed governor (par. 84).

(2) Separate the overspeed governor from the tachometer drive assembly (par. 84).

(3) Disassemble the overspeed governor in the numerical sequence as illustrated on figure 71.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with a cloth dampened in an approved cleaning solvent and dry thoroughly.

Note. Do not immerse bearing or microswitch in solvent.

(2) Inspect microswitch for positive clicking action when the plunger is depressed.

(3) Inspect governor body and cover for cracks, breaks, or other damage.

(4) Inspect the drive coupling and drive for wear. Replace defective parts as necessary.

(5) Inspect the flyweight retainer for damage and missing or broken parts. Replace defective parts as necessary.

c. Reassembly and Installation.

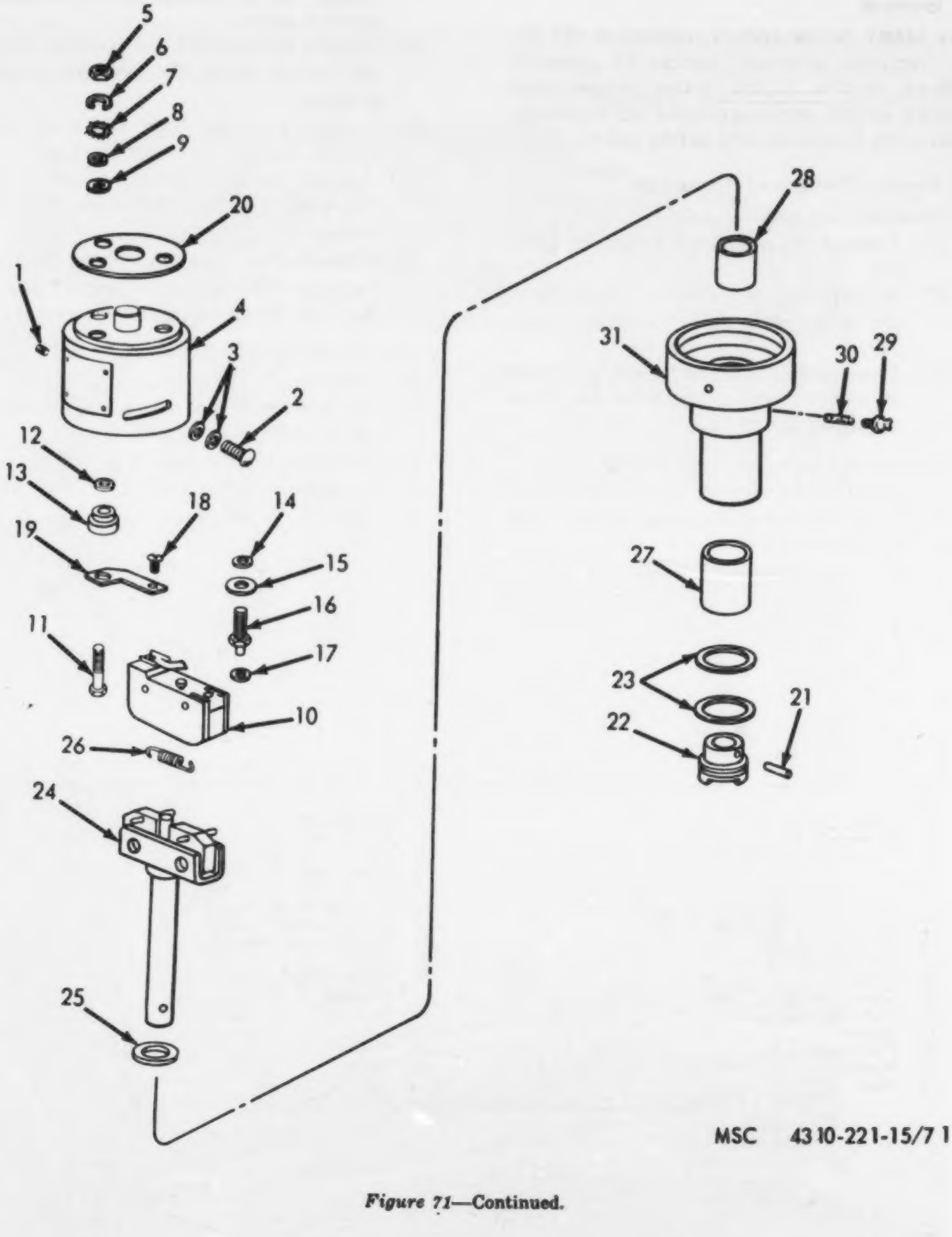
(1) Reassemble the overspeed governor in the reverse of the numerical sequence as illustrated on figure 71.

(2) Combine the overspeed governor and tachometer drive assembly (par. 84).

(3) Install the overspeed governor (par. 84).

1	Screw, special (2 rqr)
2	Screw, No. 8–32 x 1¼ in.
3	Washer, No. 8 (2 rqr)
4	Cap
5	Nut, No. 8–32
6	Lockwasher, No. 8–32 (3 rqr)
7	Lockwasher, No. 8–32 (3 rqr)
8	Bushing (3 rqr)
9	Flat washer (3 rqr)
10	Switch
11	Screw, special (2 rqr)
12	Flat washer, 3/16
13	Spacer
14	Flat washer, 3/16
15	Washer
16	Stud
17	Lockwasher
18	Screw, machine, No. 3–48 x 3/16 in. (2 rqr)
19	Bus bar (2 rqr)
20	Washer, governor cap
21	Pin
22	Tachometer drive clutch
23	Thrust washer (2 rqr)
24	Weight-shaft assembly
25	Seal
26	Spring (2 rqr)
27	Bearing
28	Bearing
29	Cup
30	Wick
31	Body

Figure 71. Engine overspeed governor, exploded view.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MSC 4310-221-15/71

Figure 71—Continued.

Section V. INTAKE AND EXHAUST VALVES

146. General

The engine has four intake and four exhaust valves. The intake valves control the admission of the fuel-air mixture to the cylinder while the exhaust valves control expulsion of the exhaust gas from the cylinder. Both the intake and exhaust valves are held closed by springs and are opened at the proper time by cams on the camshaft. The exhaust valves are made of high heat-resistant steel and are seated in alloy steel valve seat inserts.

147. Intake Valves, Exhaust Valves, and Seats

a. Removal and Disassembly.

(1) Remove the cylinder head (par. 94).

(2) Remove the carburetor (par. 59).

(3) Remove the manifold (par. 87).

(4) Remove the valve cover plate (par. 92).

(5) Disassemble the intake valves, exhaust valves, and seats in the numerical sequence as illustrated on figure 72.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the valves for carbon, burned seats, pitting, or bent stems. Scrape all carbon from valve face and stems with revolving wire brush or fine emery cloth.

(3) Inspect the valve springs for cracks, breaks, or pits. Check spring tension with a dial-type spring tester. Replace intake and exhaust valve springs that register less than 47 pounds when compressed to $1\frac{45}{64}$ inches, or 96 pounds when compressed to $1\frac{27}{64}$ inches.

(4) The measurements of the exhaust valves and guides must provide clearances between 0.003 and 0.005 inch with a desired clearance of 0.008 inch. The clearance between the intake valves and valve guides must be between 0.001 and 0.003 inch with a desired clearance of 0.005 inch. Use new valves to provide the proper clearances, if necessary. The stem diameter of new intake and exhaust valves are 0.3405 to 0.3415 inch.

(5) Inspect and repair the valves and valve seats as follows:

(*a*) *Grinding valve seats.* Slightly rough, pitted, or burned valve seats or new valve seat inserts should be reground. In most cases inserts are worn or pitted very little and require only a light refacing. Grind the valve seats to a true angle of 45° for exhaust and intake valves. Remove only enough stock to clean up pits or grooves. If a new valve seat insert has been installed, it must be refaced.

Note. A poor valve grinding job cannot be corrected by valve lapping.

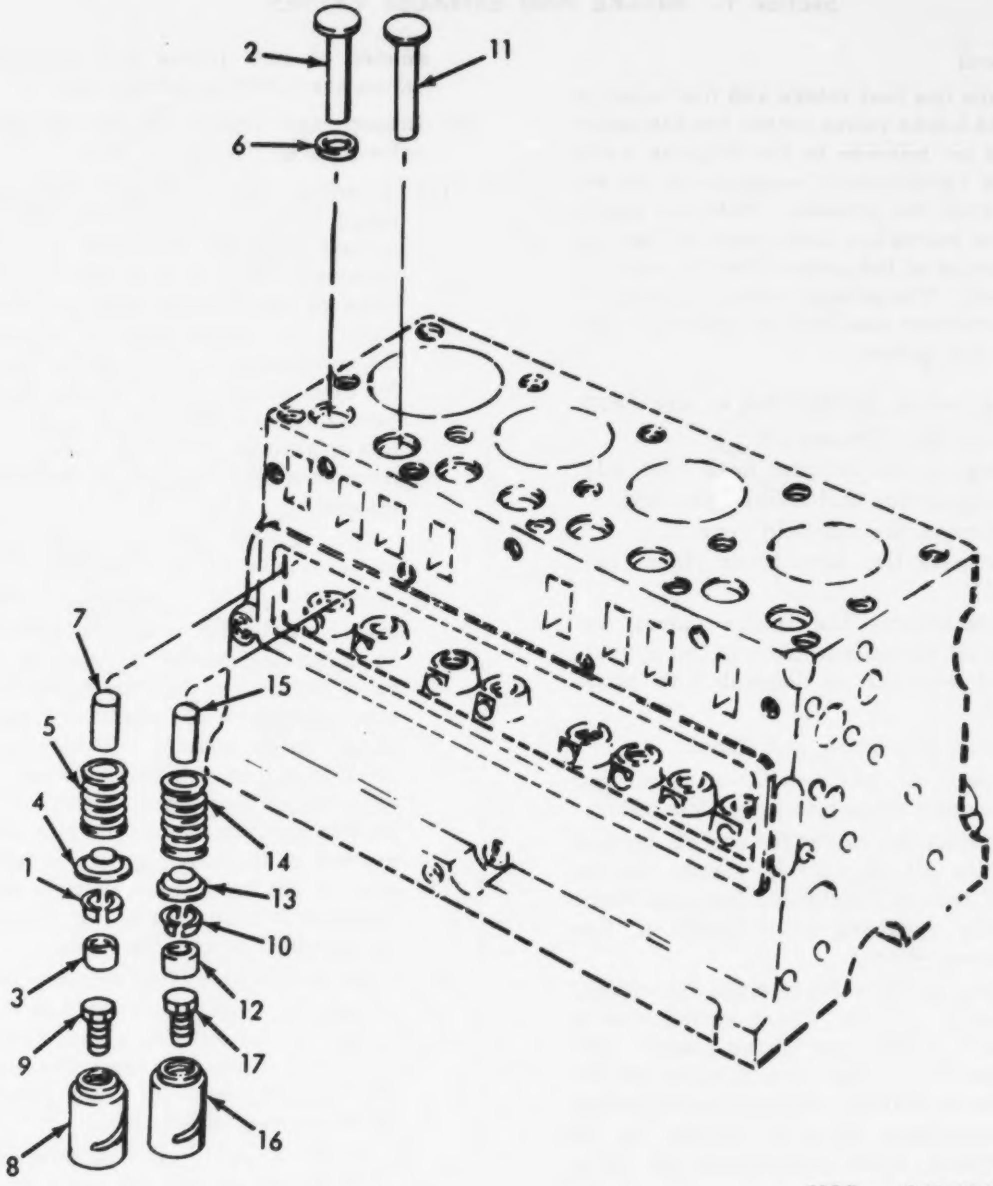
(*b*) *Refacing valves.* Measure valve seat runout with a dial indicator. If runout is excessive, grind exhaust valve faces at a 45° angle and intake valves at a 45° angle on a precision valve grinder. Follow instructions for grinding furnished with the valve grinder. Grind only enough stock to remove the pits and grooves or to remedy excessive runout. If the head of the valve is excessively thin after grinding or runout persists, replace the valve.

(*c*) *Valve grinding.* After refacing the valves and valve seat inserts as described in (*a*) and (*b*) above, lightly lap the valves into the valve seat inserts with a medium grade grinding compound as follows:

1. Apply a light, even amount of compound around the valve face and lightly lubricate the valve stem with oil.

2. Position the valve in its respective valve guide in the cylinder and crankcase block.

3. Press down lightly on the valve head with a grinding tool and at the same time rotate the valve repeatedly in both directions on the valve seat and observe the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MSC 4310-221-15/72

1	Retainer (8 rqr)
2	Exhaust valve (4 rqr)
3	Cap (4 rqr)
4	Spring seat (4 rqr)
5	Spring (4 rqr)
6	Valve seat insert (4 rqr)
7	Valve guide (4 rqr)
8	Valve lifter (4 rqr)
9	Screw, self-locking (4 rqr)
10	Retainer (8 rqr)
11	Intake valve (4 rqr)
12	Cap (4 rqr)
13	Spring seat (4 rqr)
14	Spring (4 rqr)
15	Valve guide (4 rqr)
16	Valve lifter (4 rqr)
17	Screw, self-locking (4 rqr)

Figure 72. Intake valves, exhaust valves, and seats, exploded view.

ring left by the grinding compound on the valve face and valve seat insert. A valve which is properly seated will have a ring completely around the valve face.

Caution: **Do not overgrind the valves.**

4. Grind the remaining valves in a similar manner. After all valves have been fully seated, wipe off all excess grinding compound.

c. Reassembly and Installation.

Caution: **Do not attempt to drive in an oversize insert before machining the counterbore. A broken cylinder bore or insert may result.**

(1) Reassemble the intake and exhaust valves in the reverse of the numerical sequence as illutsrated on figure 72.
(2) Install the cylinder head (par. 94).
(3) Install the manifold (par. 87).
(4) Install the carburetor (par. 59).
(5) Adjust the valves (par. 93).
(6) Install the valve cover plate (par. 92).

Section VI. ENGINE SPEED GOVERNOR

148. General

The engine speed governor is a gear-driven, flyball type unit mounted at the front of the engine. Regulated engine speed is accomplished by centrifugal force created by steel balls inside the governor housing. The steel balls move outward from the drive shaft as the rate of engine speed and governor shaft revolution increases. This outward movement is opposed by an external adjustable linkage, so the amount of movement for a desired speed can be controlled.

149. Engine Speed Governor

a. Removal and Disassembly.

(1) Remove the governor from the engine (par. 95).
(2) Disassemble the engine speed governor in the numerical sequence as instructed on figure 73.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts except the bearings with an approved cleaning solvent and dry thoroughly.
(2) Clean and inspect the bearings by placing in a wire basket and dipping the basket up and down in a container of clean, approved, cleaning solvent until all dirt is removed. Shake out the bearings and allow to dry naturally. Do not spin the bearings while drying. Dip bearings in light oil.
(3) Inspect bearings for wear, roughness, scoring, out-of-round, or other damage.
(4) Inspect the body for cracks, breaks, and wear or distortion of the sleeve bearing. Replace if defective.
(5) Inspect the lever, shaft, and fork for signs of wear.
(6) Inspect the gear for worn, chipped, or damaged teeth.
(7) Replace all defective parts as required.

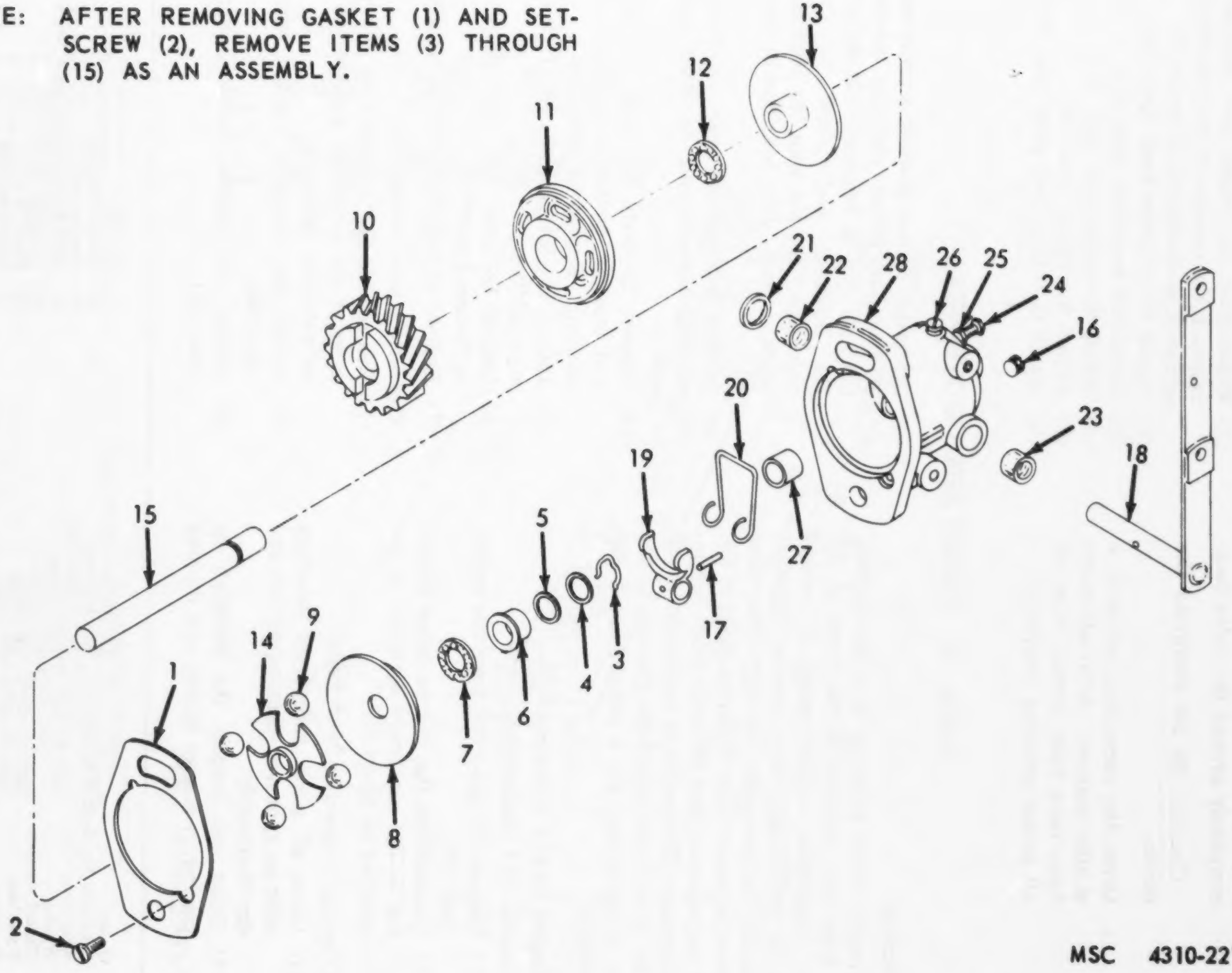
c. Reassembly and Installation.

(1) Reassemble the governor in the reverse of the numerical sequence as illustrated on figure 73.
(2) Install the governor on the engine (par. 95).
(3) Adjust the engine speed governor (par. 95).

---

1 Gasket
2 Setscrew No. 8-32 x ⅜ in.
3 Retaining clip
4 Washer
5 Thrust washer
6 Fork base
7 Bearing
8 Upper race
9 Ball (4 rqr)
10 Drive gear
11 Spacer, lower race
12 Bearing
13 Lower race
14 Driver
15 Shaft
16 Plug
17 Pin
18 Shaft and lever assembly
19 Fork
20 Fork
21 Oil seal
22 Needle bearing
23 Needle bearing
24 Adjusting scre, ¼-28 x 1⅜ in.
25 Locknut, ½-28
26 Plug, ⅛ in.
27 Sleeve bearing
28 Body

Figure 73. Engine speed governor, exploded view.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NOTE: AFTER REMOVING GASKET (1) AND SETSCREW (2), REMOVE ITEMS (3) THROUGH (15) AS AN ASSEMBLY.

Figure 73—Continued.

Section VII. GEARCASE COVER, CRANKSHAFT AND CAMSHAFT GEARS

150. General

The crankshaft and camshaft gears are commonly referred to as timing gears. The gears are stamped with timing marks, which, when alined, synchronize the opening and closing of the valves with the movement of the pistons.

151. Gearcase Cover, Crankshaft and Camshaft Gears

a. Removal.

(1) Remove the engine (par. 136).

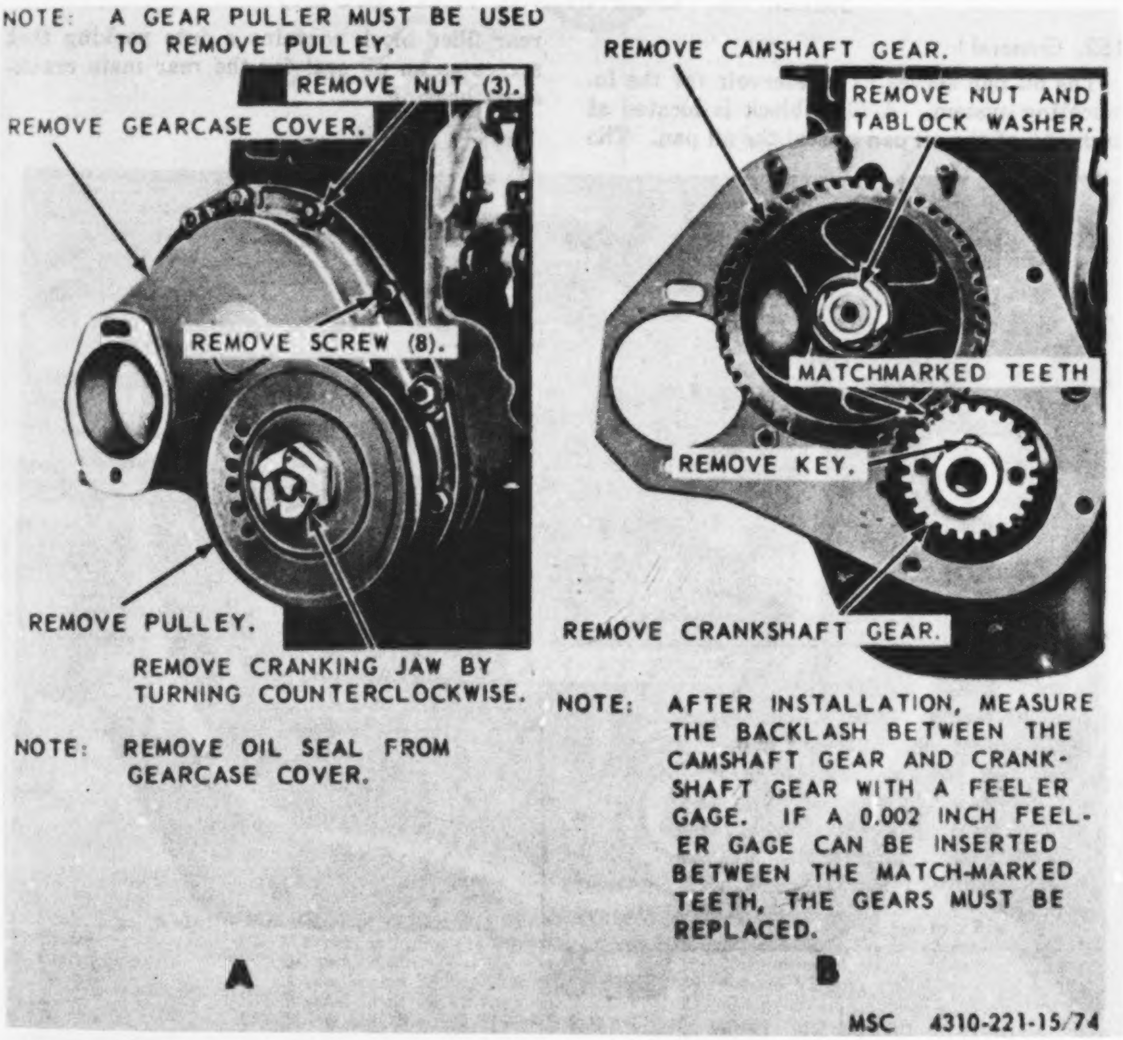
(2) Remove the magneto and governor (pars. 72 and 95).

(3) Remove the generator drive belt and fan (pars. 67 and 77).

(4) Remove the crankshaft pulley and gearcase cover and measure the backlash as instructed on figure 74.

(5) Remove the crankshaft and camshaft gears as instructed on figure 74.

NOTE: A GEAR PULLER MUST BE USED TO REMOVE PULLEY.


REMOVE NUT (3).
REMOVE GEARCASE COVER.
REMOVE SCREW (8).
REMOVE PULLEY.
REMOVE CRANKING JAW BY TURNING COUNTERCLOCKWISE.
A
REMOVE CAMSHAFT GEAR.
REMOVE NUT AND TABLOCK WASHER.
MATCHMARKED TEETH
REMOVE KEY.
REMOVE CRANKSHAFT GEAR.
B
MSC 4310-221-15/74

NOTE: REMOVE OIL SEAL FROM GEARCASE COVER.

NOTE: AFTER INSTALLATION, MEASURE THE BACKLASH BETWEEN THE CAMSHAFT GEAR AND CRANKSHAFT GEAR WITH A FEELER GAGE. IF A 0.002 INCH FEELER GAGE CAN BE INSERTED BETWEEN THE MATCH-MARKED TEETH, THE GEARS MUST BE REPLACED.

A—Gearcase cover and pulley B—Crankshaft and camshaft gears

Figure 74. Gearcase cover, pulley, crankshaft and camshaft gears, removal, installation, and backlash dimensions.

b. Cleaning, Inspection, and Repair.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect the gearcase cover for cracks, breaks, and other damage.
- (3) Inspect the crankshaft and camshaft gear for wear and chipped, broken, or worn teeth.
- (4) Inspect the starting jaw and fan drive pulley for cracks, breaks, or other damage.
- (5) Inspect the front end plate for breaks, bends, or elongated mounting holes.
- (6) Replace the gearcase cover gasket and seal, and any other defective parts as required.

c. Installation.

- (1) Install the crankshaft and camshaft gears, and measure the backlash as instructed on figure 74.
- (2) Install the gearcase cover and pulley in reverse of the instructions on figure 74.
- (3) Install the fan (par. 77) and generator drive belt (par. 67).
- (4) Install the governor (par. 95) and magneto (par. 72).
- (5) Install the engine (par. 136).

Section VIII. OIL PAN AND FILLER BLOCKS

152. General

The oil pan serves as a reservoir for the lubricating system. A filler block is located at each end of the oil pan to seal the oil pan. The rear filler block contains a jute packing that serves as an oil seal for the rear main crankshaft bearing.

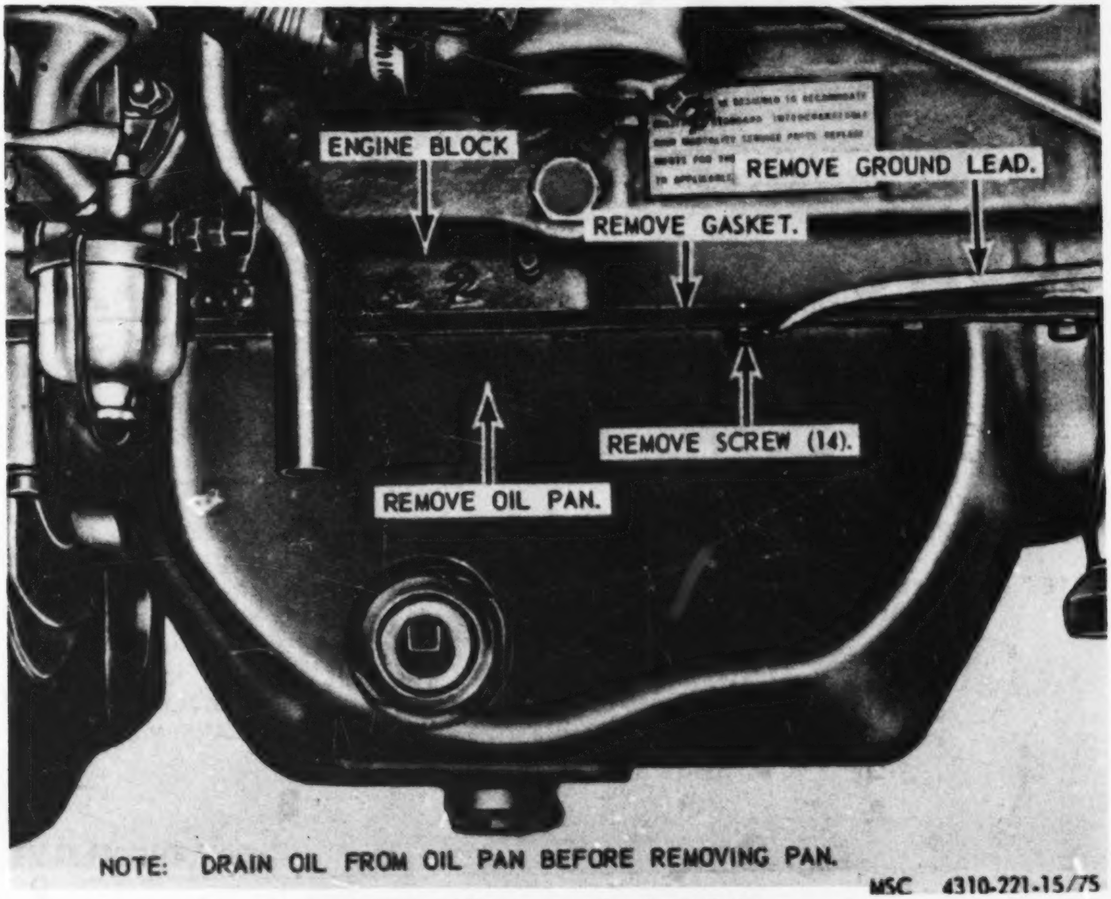

ENGINE BLOCK
REMOVE GROUND LEAD.
REMOVE GASKET.
REMOVE SCREW (14).
REMOVE OIL PAN.
NOTE: DRAIN OIL FROM OIL PAN BEFORE REMOVING PAN.
MSC 4310-221-15/75

Figure 75. Oil pan, removal and installation.

153. Oil Pan

a. Removal and Disassembly.

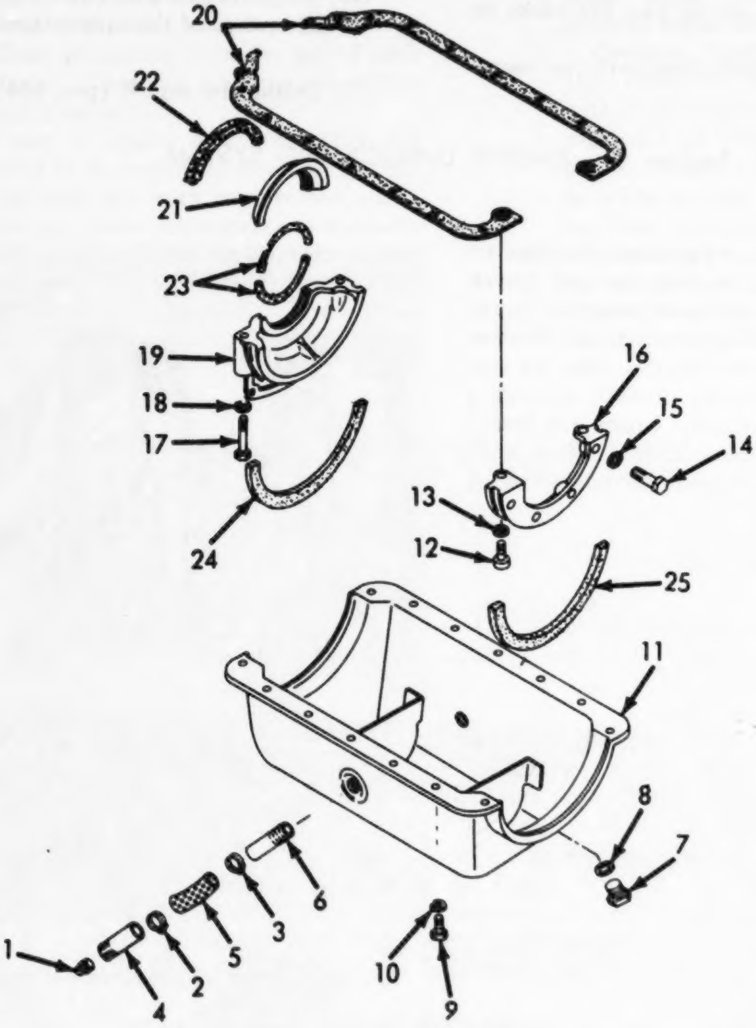
(1) Remove the engine (par. 136).

(2) Remove the oil pan as instructed on figure 75.

(3) Disassemble the oil pan and filler blocks in the order of numerical sequence as illustrated on figure 76.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.



MSC 4310-221-15/76

1	Plug, pipe, ⅜–14
2	Clamp
3	Clamp
4	Nipple
5	Hose
6	Nipple
7	Plug, drain, ⅞–16
8	Washer
9	Screw, cap, ⁵⁄₁₆–18 x ¾ in. (14 rqr)
10	Washer, lock, ⁵⁄₁₆ (14 rqr)
11	Oil pan
12	Screw, socket hd, ⁵⁄₁₆–18 x ⅞ in. (2 rqr)
13	Washer, lock, ⁵⁄₁₆ (2 rqr)
14	Screw, cap, ⁵⁄₁₆–18 x ⅞ in. (2 rqr)
15	Washer, lock, ⁵⁄₁₆ (2 rqr)
16	Front filler block
17	Screw, socket hd, ⁵⁄₁₆–18 x 2⅝ in. (2 rqr)
18	Washer, lock, ⁵⁄₁₆ in. (2 rqr)
19	Rear filler block
20	Gasket (2 rqr)
21	Oil guard
22	Felt
23	Seal (2 rqr)
24	Gasket
25	Gasket

Figure 76. Oil pan, exploded view.

(2) Inspect the oil pan for cracks, dents, or other damage. Repair oil pan by welding cracks or breaks.
(3) Inspect the oil filler blocks for damage.
(4) Remove all gasket material from engine block. Inspect the surface of the engine block or oil pan for nicks or burrs.
(5) Replace all defective parts as necessary.

c. Reassembly and Installation.

(1) Reassemble the oil pan and filler blocks in the reverse order of numerical sequence as illustrated on figure 76.
(2) Install the oil pan on the engine block in reverse of the instructions on figure 75.
(3) Install the engine (par. 136).

Section IX. ENGINE LUBRICATING SYSTEM

154. General

The oil pump is a gear-type unit mounted on the center crankshaft bearing cap and driven by the camshaft. Oil is drawn from the engine oil pan through the oil strainer on the bottom of the oil pump. On leaving the pressure side of the pump, the oil passes upward through a passage in the oil pump body, where it is forced into the main oil passages in the engine block and distributed to the various internal working parts of the engine.

155. Engine Oil Pump

a. Removal.

(1) Remove the engine oil pan (par. 153).
(2) Remove the engine oil pump as instructed on figure 77.

b. Cleaning and Inspection.

(1) Clean the oil pump with an approved cleaning solvent and dry thoroughly.
(2) Inspect the oil pump for cracks, breaks, and damaged screen. Replace a defective oil pump as necessary.

c. Installation.

(1) Install the engine oil pump in reverse of the instructions on figure 77.
(2) Install the engine oil pan (par. 153).

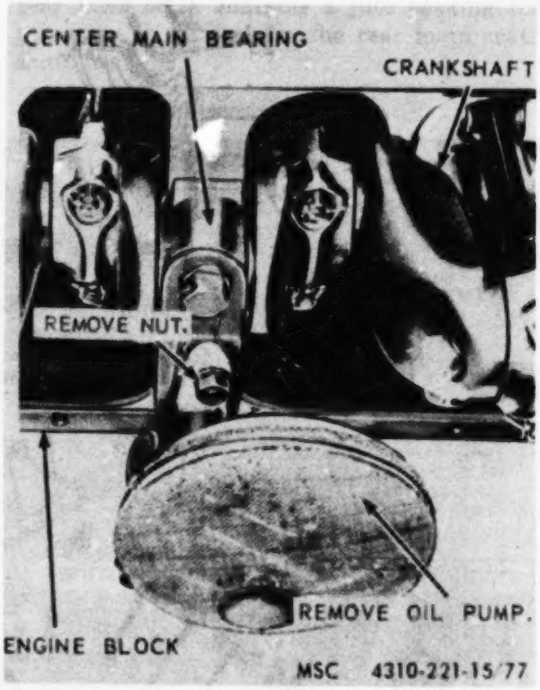


Figure 77. Engine oil pump, removal and installation.

Section X. CONNECTING RODS AND PISTONS

156. General

The connecting rods and caps are drop-forged. An oil-spray hole is drilled through the connecting rod to direct a flow of oil on the cylinder walls. The pistons are made of heat-treated aluminum and carry four rings and three expanders above the piston pin. The two top rings are compression rings; the two bottom rings are oil control rings. The pistons are connected to the connecting rods by floating piston pins held in place by retaining rings.

157. Connecting Rods and Pistons

a. Removal and Disassembly.

(1) Remove the engine (par. 136).
(2) Remove the cylinder head (par. 94).

(3) Remove the oil pan and filler blocks (par. 153).

(4) Remove the connecting rods and pistons as instructed on figure 78.

(5) Disassemble the connecting rods and pistons in the order of numerical sequence as illustrated on figure 79.

b. Cleaning, Inspection, and Repair.

(1) Clean all carbon from the top of each piston. Clean the ring grooves with a ring-groove tool.

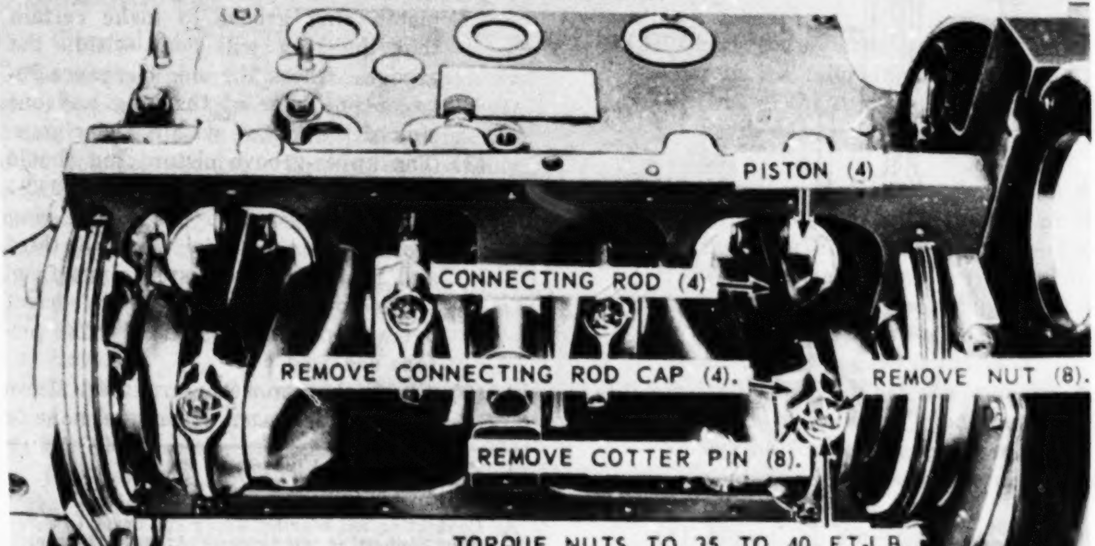
(2) Clean all piston and connecting rod parts in an approved cleaning solvent and blow dry with compressed air.

(3) Use an inside micrometer to measure the cylinder bores at several points. Compare these measurements with those shown in table III. The difference in these measurements will determine the amount of wear in the cylinder bore, the taper, and the out-of-round condition.

(4) If the cylinder bores are worn more than 0.008 inch, rebore the cylinder with conventional reboring equipment and hone until the bores are not more than 0.001 inch out-of-round or tapered more than 0.001 inch.

Caution: Before boring or honing the cylinder, wrap the crankshaft with rags to protect bearing surfaces, pins, and oil holes from abrasive particles. Measure the cylinder frequently while honing to keep from honing the bore oversize.

(5) Check each piston ring in the cylinder by checking the gap between the ends of the piston ring. Measure the ring gap with a feeler gage; the gap must not be more than 0.020 inch or less



NOTE: RIDGE-REAM TOP OF CYLINDER BORE AND REMOVE CONNECTING ROD AND PISTON THROUGH THE TOP OF THE ENGINE.

NOTE: REFER TO TABLE III FOR WEAR LIMITS.

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Figure 78. Connecting rod and piston, removal and installation.

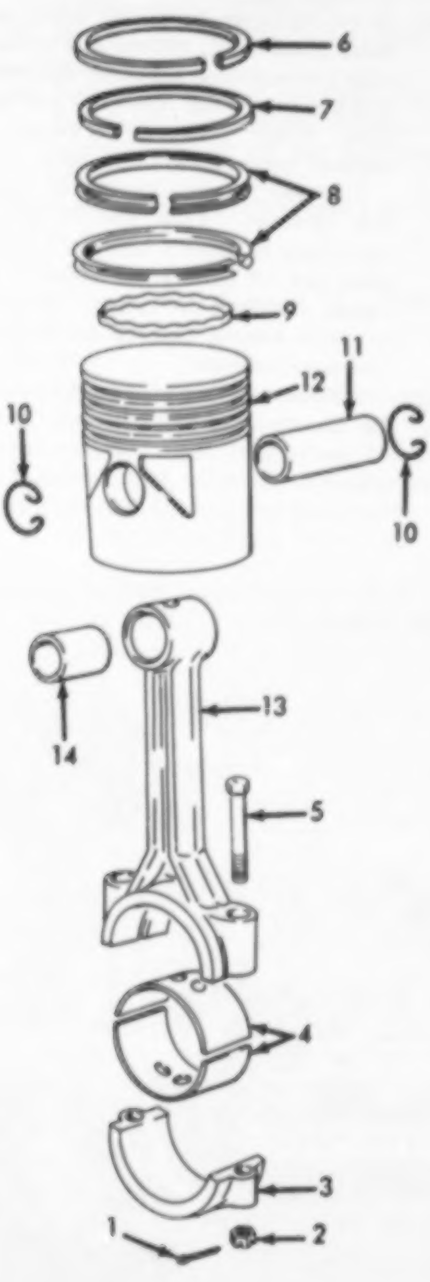
than 0.010 inch. If the gap is too large, use a new ring. If the gap is too small, file off the end of the piston ring. Measure the gap frequently to keep from filing off too much stock.

(6) Place a 0.0015 inch feeler gage into the cylinder bore from the top of the block. Insert the correct piston in the bore upside down, and approximately half-way down the bore. Clamp a pull scale to the feeler gage and pull the feeler gage out. The spring scale should show a 5- to 10-pound pull. Check the feeler gage pull in at least three different places in the cylinder bore. If the scale reading exceeds 10 pounds, run the hone through the bore until the correct pull on the feeler gage is obtained. If the spring scale does not register or if the reading is less than a 5-pound pull, use the next larger oversized piston and hone the bore until the correct reading is obtained. Fit all four pistons in this same manner.

(7) Check each piston ring in its proper piston ring groove to make certain that the ring will float within the groove. Check the side clearance between one edge of the ring and one side of the groove with a feeler gage.

(8) The upper-groove piston ring should have a side clearance of 0.002 to 0.004 inch, the second groove piston ring from 0.001 to 0.003 inch, and the third and fourth groove piston rings from 0.0015 to 0.0025 inch. Use the correct oversize piston rings if oversize pistons are used.

(9) Check the connecting rod and sleeve bushing for wear. Ream and hone or



1	Pin, cotter, $\frac{3}{32}$ x 1 in. (8 rqr)
2	Nut, hex, slotted, $\frac{3}{8}$-24 (8 rqr)
3	Connecting rod cap (4 rqr)
4	Connecting rod bearing, upper and lower (4 rqr)
5	Bolt, connecting rod, special, $\frac{3}{8}$-24 x $2\frac{5}{16}$ in. (8 rqr)
6	Top compression ring (4 rqr)
7	Intermediate compression ring (4 rqr)
8	Oil control ring (8 rqr)
9	Oil control ring expander (4 rqr)
10	Retaining ring (8 rqr)
11	Piston pin (4 rqr)
12	Piston (4 rqr)
13	Connecting rod (4 rqr)
14	Bushing, piston pin (4 rqr)

Figure 79. Connecting rods and pistons—exploded view.

replace bearings, depending on their condition. Press in new bushing, being careful to line up the oil hole with the oil hoses in the connecting rod. The maximum clearance between the pin and the bushing is 0.0005 inch and the minimum clearance is 0.0003 inch. The desired clearance is 0.0003 inch.

Caution: **Do not file or scrape mating edges of connecting rod and cap to tighten bearings on the crankshaft journal. This will seriously and permanently damage the connecting rod alinement with the crankshaft.**

(10) When installing the connecting rod bearings in the connecting rod and cap, secure the cap to the rod. Use an inside micrometer to measure the inside diameter of the connecting rod. Measure the connecting rod journals on the crankshaft. The clearance between the conecting rod bearing and the crankshaft connecting rod journal must be between 0.001 and 0.002 inch. Replace excessively worn bearings. Each connecting rod and bearing must be individually fitted to its respective crankshaft journal.

c. Reassembly and Installation.

(1) Reassemble the connecting rods and pistons in the reverse of the numerical sequence as illustrated on figure 79.

Note. The first and second groove piston rings are stamped TOP. This side of the ring should face toward the top of the piston.

(2) Install the connecting rods and pistons in reverse of the instructions on figure 78.

(3) Install the oil pan and filler blocks (par. 153).

(4) Install the cylinder head (par. 94).

(5) Install the engine (par. 136).

Section XI. FLYWHEEL AND FLYWHEEL HOUSING

158. General

The flywheel assembly is located in the flywheel housing and is secured to the crankshaft. It can be installed in only one position because of the bolt hole spacing. The flywheel housing. is mounted on the engine block and must be concentric to the flywheel assembly, and the flywheel assembly must be concentric to the coupling disk.

159. Flywheel and Housing

a. Removal.

(1) Remove and separate the engine and compressor (par. 136).

(2) Remove the starter motor (par. 66).

(3) Remove the compressor internal drive gear, flywheel and ring gear, and flywheel housing as instructed on figure 80.

b. Cleaning and Inspection.

(1) Clean the flywheel, ring gear, and flywheel housing with an approved cleaning solvent and dry thoroughly.

(2) Inspect the flywheel and ring gear for nicks, burrs, and broken or worn teeth. Replace a damaged gear.

(3) Check the flywheel assembly for runout in the following manner:

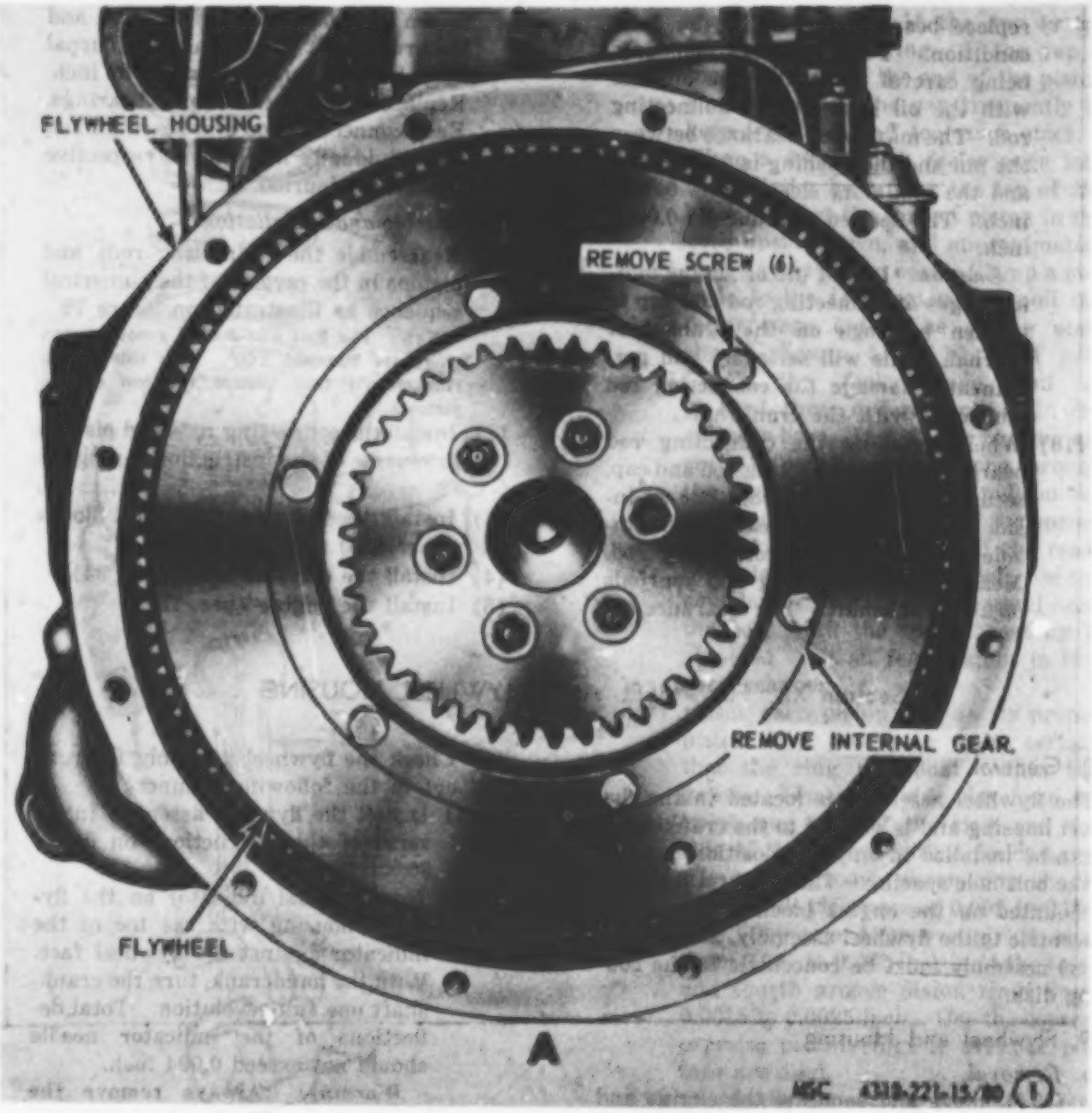
(*a*) Install the flywheel assembly in reverse of the instructions on figure 80.

(*b*) Mount a dial indicator on the flywheel housing with the toe of the indicator against the flywheel face. With the handcrank, turn the crankshaft one full revolution. Total deflections of the indicator needle should not exceed 0.004 inch.

Warning: **Always remove the spark plugs when handcranking the engine for testing purposes to prevent accidental starting of the engine.**

(*c*) Mount the dial indicator on the flywheel with the toe of the indicator against the face of the flywheel housing. Turn the crankshaft one full revolution. Total deflection of the indicator needle should not exceed 0.004 inch.

(*d*) Mount the dial indicator on the flywheel housing with the toe of the



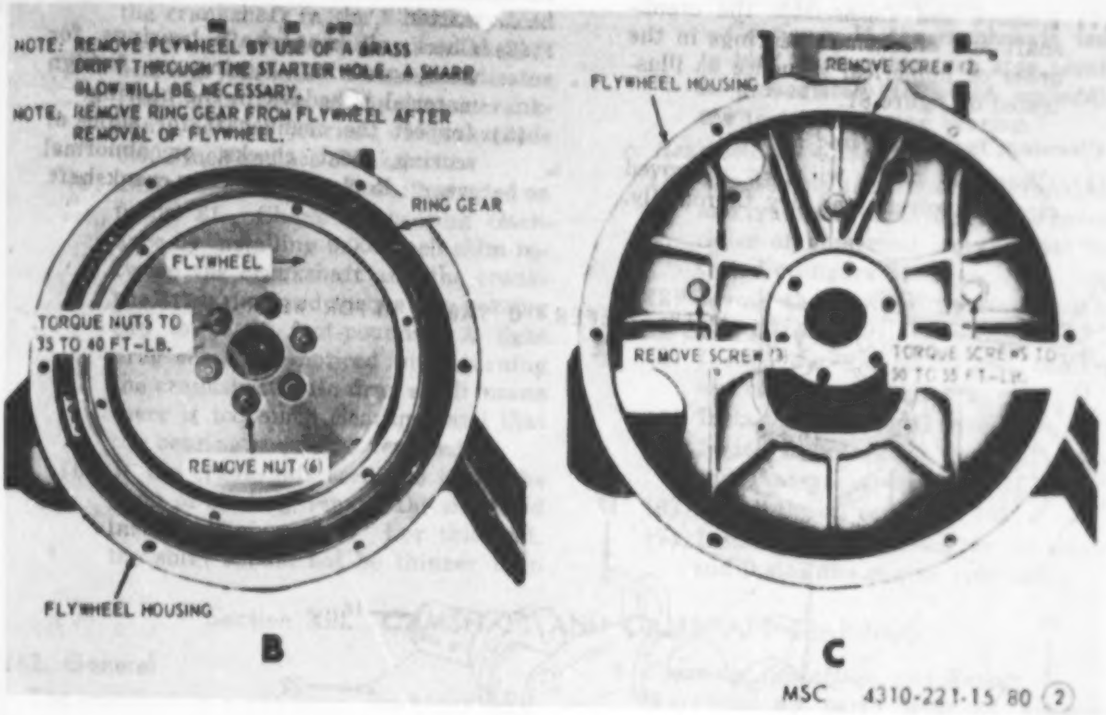
A—Compressor internal drive gear

Figure 80. Flywheel ring gear, compressor internal drive gear, and flywheel housing, removal and installation.

indicator against the outer shoulder of the flywheel radius. Turn the crankshaft one full revolution. Total deflection of the indicator needle should not exceed 0.005 inch.

(*e*) Mount the dial indicator at the top of the flywheel housing in the same manner given in (*d*) above. Check for excessive main bearing clearance by carefully lifting with a suitable tool between the bottom of the flywheel and flywheel housing. Total deflection of the indicator needle should not exceed 0.003 inch.

(*f*) Mount the dial indicator on the flywheel with the toe of the indicator against the inside surface of the flywheel housing bore. Turn the


NOTE: REMOVE FLYWHEEL BY USE OF A BRASS DRIFT THROUGH THE STARTER HOLE. A SHARP BLOW WILL BE NECESSARY.
NOTE: REMOVE RING GEAR FROM FLYWHEEL AFTER REMOVAL OF FLYWHEEL.
RING GEAR
FLYWHEEL
TORQUE NUTS TO 35 TO 40 FT-LB.
REMOVE NUT (6)
FLYWHEEL HOUSING
B
FLYWHEEL HOUSING
REMOVE SCREW (2)
REMOVE SCREW (3)
TORQUE SCREWS TO 30 TO 35 FT-LB.
C
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B—Flywheel and ring gear
C—Flywheel housing
Figure 80—Continued.

crankshaft one full revolution. Total deflection of the indicator needle should not exceed 0.010 inch. Replace a defective flywheel.

c. Installation.

(1) Install the flywheel housing, ring gear, flywheel, and compressor internal drive gear in reverse of the instructions on figure 80.

(2) Install the starter motor (par. 66).

(3) Install the compressor to the engine and install the engine (par. 136).

Section XII. CRANKSHAFT AND CRANKSHAFT BEARINGS

160. General

The crankshaft transfers the motion of the pistons and connecting rods into a rotary motion. It is supported in the crankcase by the main bearings. The camshaft is driven by helical gears mounted on the camshaft and crankshaft. Cam lobes on the camshaft actuate the valve lifters and fuel pump. A flyball-type governor is mounted on the timing gear cover, driven by the camshaft gear, which controls the engine speed.

161. Crankshaft and Bearings

a. Removal and Disassembly.

(1) Remove and separate the compressor from engine (par. 136).

(2) Remove the oil pan (par. 153).

(3) Remove the gearcase cover, camshaft, and camshaft gears (par. 151).

(4) Remove the oil pump (par. 155).

(5) Remove the connecting rod bearings and caps (par. 157).

(6) Remove the flywheel and flywheel housing (par. 159).

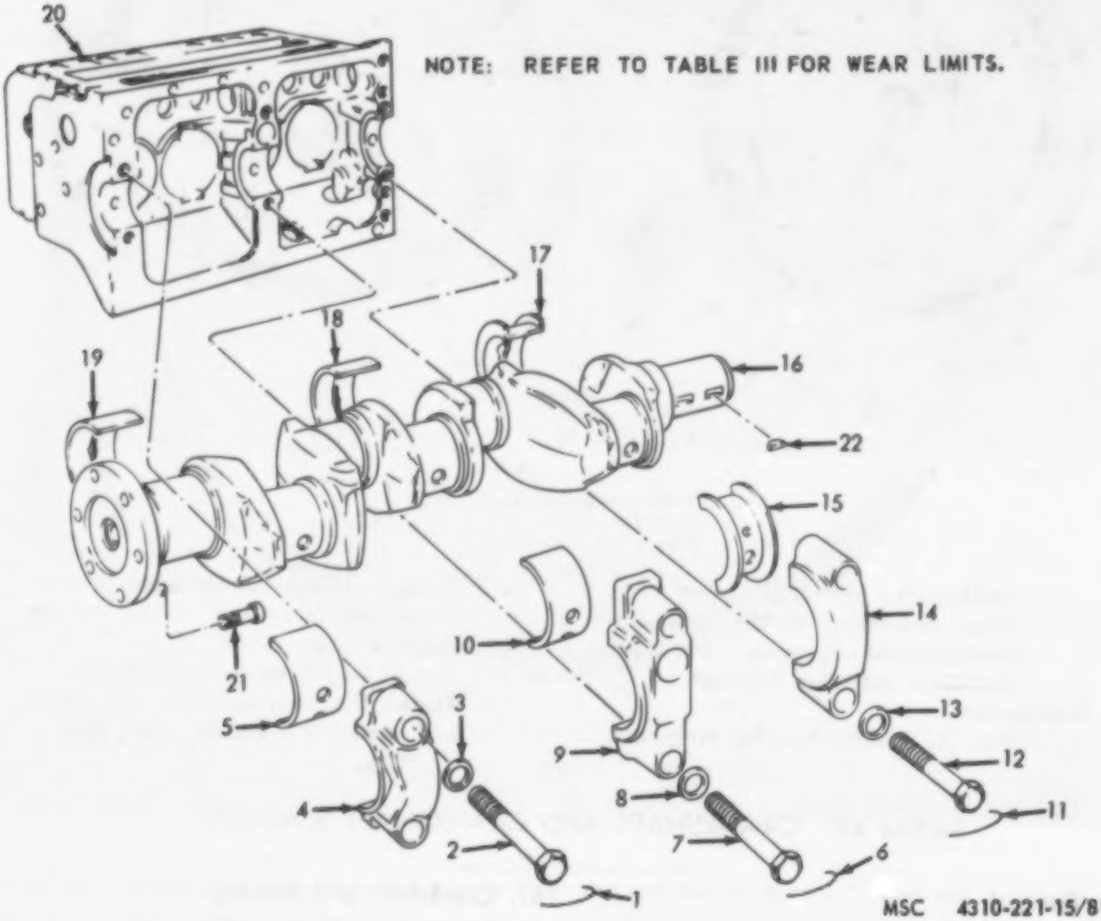
(7) Remove and disassemble the crankshaft and crankshaft bearings in the order of numerical sequence as illustrated on figure 81.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly. Make sure all oil passages in the crankshaft are clean and removed of all accumulated carbon or foreign matter.

(2) Check all crankshaft bearings for wear, grooving, scoring, or foreign material imbedded in the bearing.

(3) Inspect the crankshaft for signs of scoring, heat checks, or abnormal wear. Replace a defective crankshaft.



NOTE: REFER TO TABLE III FOR WEAR LIMITS.

MSC 4310-221-15/81

1	Lockwire
2	Bolt, machine, ½-13 x 2⅝ in. (2 rqr)
3	Washer, flat, 17/32 id, ⅞ od, ⅛ thk (2 rqr)
4	Rear bearing cap
5	Crankshaft bearing, lower half
6	Lockwire
7	Bolt, machine, ½-13 x 3¼ in. (2 rqr)
8	Washer, flat, 17/32 id, ⅞ od, ⅛ thk (2 rqr)
9	Intermediate bearing cap
10	Crankshaft bearing, lower half
11	Lockwire
12	Bolt, machine, ½-13 x 2⅝ in. (2 rqr)
13	Washer, flat, 17/32 id, ⅞ od, ⅛ thk (2 rqr)
14	Front bearing cap
15	Crankshaft bearing, lower half
16	Crankshaft
17	Crankshaft bearing, upper half
18	Crankshaft bearing, upper half
19	Crankshaft bearing, upper half
20	Engine block
21	Flywheel bolt, special
22	Key

Figure 81. Crankshaft and crankshaft bearings, exploded view.

(4) Check the crankshaft runout by placing crankshaft in two V-blocks. Mount the crankshaft in the V-blocks placed beneath the front and rear crankshaft bearing journals. The dial indicator reading is taken at the center crankshaft bearing journal. If it exceeds 0.002 inch replace crankshaft.

(5) Install the crankshaft as illustrated on figure 81. Check the bearing clearance by installing 0.002 inch shim between the crankshaft and the crankshaft bearing and torque the bearing cap to 85–95 foot-pounds. A light drag should be noticed when turning the crankshaft. No drag at all means there is too much clearance and that the bearing should be replaced.

(6) If the crankshaft seems to be at the point of binding, remove the shim and install a lighter one. For this test, the shim should not be thinner than 0.001 inch. Repeat this test for the remaining two bearings.

Caution: If the crankshaft tends to bind during this test, stop turning it immediately to avoid embedding the test shim in the bearing.

c. Reassembly and Installation.

(1) Reassemble and install the crankshaft and crankshaft bearings in the reverse order of numerical sequence as illustrated on figure 81.

(2) Install the flywheel housing and flywheel (par. 159).

(3) Install the connecting rod bearings and caps (par. 157).

(4) Install the oil pump (par. 155).

(5) Install the camshaft, camshaft gears, and gearcase cover (par. 151).

(6) Install the oil pan (par. 153).

(7) Install the compressor to the engine and install the engine (par. 136).

Section XIII. CAMSHAFT AND CAMSHAFT BEARINGS

162. General

The camshaft is a one-piece, machined forging driven through gears by the crankshaft. It operates the oil pump, valves, and fuel pump by means of the integral oil pump drive gear and cam lobes. The camshaft rides in sleeve bearings pressed in the engine block.

163. Camshaft and Bearings

a. Removal and Disassembly.

(1) Remove and separate the compressor from the engine (par. 136).

(2) Remove the fuel pump (par. 60).

(3) Remove the generator (par. 67).

(4) Remove the water pump (par. 78).

(5) Remove the intake and exhaust valves (par. 147).

(6) Remove the gearcase cover and camshaft gears (par. 151).

(7) Remove the oil pump (par. 155).

(8) Remove the engine speed governor (par. 95).

(9) Remove the flywheel housing (par. 159).

(10) Remove and disassemble the camshaft and bearings in the order of numerical sequence as illustrated on figure 82.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

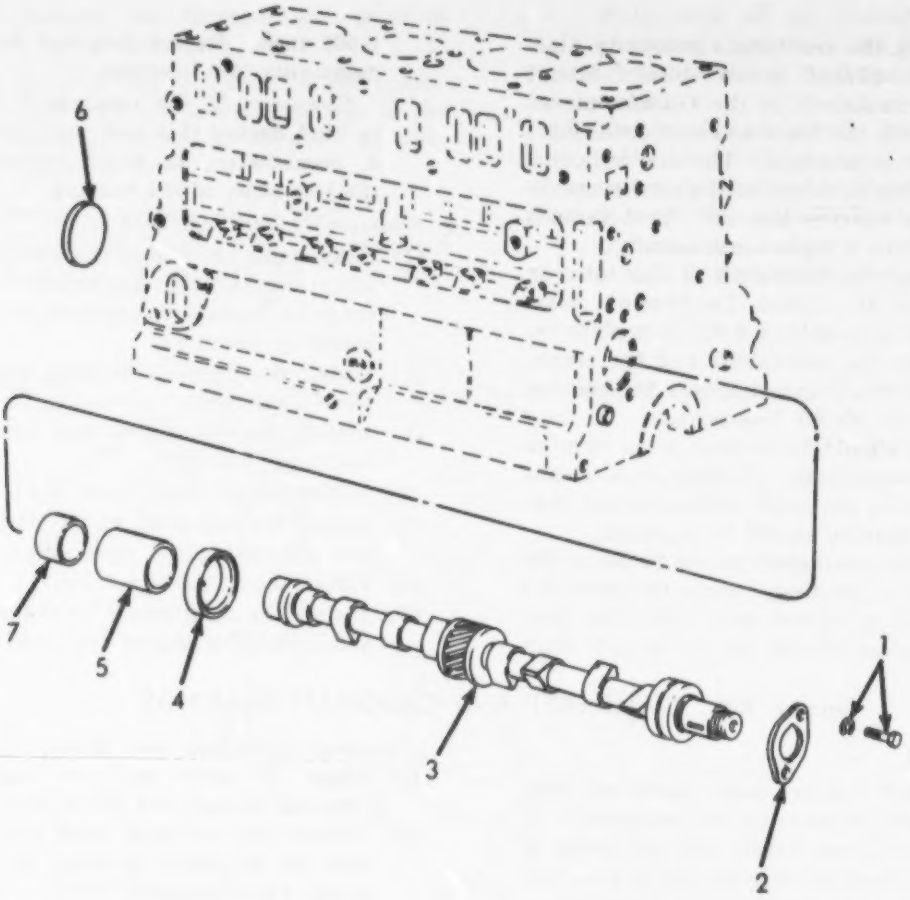
(2) Inspect the camshaft lobes and journals for scratches, grooved, or excessively worn surfaces. If the journals are worn in excess of 0.002 inch, replace the camshaft.

(3) Place paper strips soaked in oil on two V-blocks. Support the camshaft on the two end journals with the V-blocks and, using a dial indicator, check the runout of the center journal. If it is more than 0.003 inch, replace the camshaft.

(4) Carefully insert the camshaft into the engine block and measure the bearing clearance with a feeler gage. If the bearing clearance in either of the two end bearings exceeds 0.008 inch or if the clearance in the center bearing exceeds 0.008 inch, replace all three bearings.

c. Reassembly and Installation.

(1) Reassemble and install the camshaft and bearings in the reverse order of numerical sequence as illustrated on figure 82.



1	Screw and lockwasher assembly, ⅜–16 x ⅞ in. (2 rqr)
2	Thrust washer
3	Camshaft
4	Bushing, front
5	Bushing, center
6	Expansion plug
7	Bushing, rear

Figure 82. Camshaft—exploded view.

(2) Install the flywheel housing (par. 159).
(3) Install the engine speed governor (par. 95).
(4) Install the oil pump (par. 155).
(5) Install the camshaft gears and gear-case cover (par. 151).
(6) Install the intake and exhaust valves (par. 147).
(7) Install the water pump (par. 78).
(8) Install the generator (par. 67).
(9) Install the fuel pump (par. 60).
(10) Install the compressor to the engine and install engine (par. 136).

Section XIV. ENGINE BLOCK ASSEMBLY

164. General

The engine block is the main structural part of the engine; it has full length water jackets surrounding every cylinder, to insure cooling of the pistons and rings. The one-piece casting houses the camshaft, crankshaft, connecting rods, pistons, valves, and valve lifters. Passages are drilled in the block for carrying oil under pressure to the bearings and other vital parts requiring forced-feed lubrication.

165. Engine Block

a. Removal.

(1) Remove the engine and separate the compressor from the engine (par. 136).
(2) Remove the starter motor (par. 66).
(3) Remove the engine generator (par. 67).
(4) Remove the intake and exhaust manifold (par. 87).
(5) Remove the fuel pump (par. 60).
(6) Remove the oil pressure relief valve (par. 90).
(7) Remove the water pump (par. 78).
(8) Remove the connecting rods and pistons (par. 157).
(9) Remove the crankshaft and crankshaft bearings (par. 161).
(10) Remove the camshaft and camshaft bearings (par. 163).
(11) Remove the valves and valve guides (par. 147).

b. Cleaning, Inspection, and Repair.

(1) Clean the engine block with an approved cleaning solvent and blow dry with compressed air.
(2) Scrape all rust and scale from engine block water jacket and blow clear with compressed air.
(3) Loosen deposits in the oil galleries and passages with a suitable brush and an approved cleaning solvent and blow clear with compressed air.
(4) Remove all traces of gasket material from the mating surfaces of the engine block.
(5) Inspect engine block for cracks or other damage that would render it unserviceable, and replace it if necessary.
(6) Examine engine block for warpage and high spots. Remove all nicks and burrs that would interfere with the proper fit of the cylinder head, oil pan, flywheel housing, crankcase, end plate, or water pump.
(7) Retap any damaged thread holes.

c. Installation.

(1) Install the valves and valve guides (par. 147).
(2) Install the camshaft bearings and camshaft (par. 163).
(3) Install the crankshaft bearings and crankshaft (par. 161).
(4) Install the pistons and connecting rods (par. 157).
(5) Install the water pump (par. 78).
(6) Install the oil pressure relief valve (par. 90).
(7) Install the intake and exhaust manifold (par. 87).
(8) Install the engine generator (par. 67).
(9) Install the starter motor (par. 66).
(10) Install the fuel pump (par. 60).
(11) Install the compressor and engine assembly (par. 136).

Note. If an indefinite period of time is to elapse before the engine block is reassembled, coat all surfaces with an approved rust preventative.

Section XV. SPEED AND PRESSURE REGULATOR ASSEMBLY

166. General

The speed and pressure regulator works in conjunction with the volumetric regulator and the pressure reducing valve to control the compressor output in accordance with air demand. Separator pressure passes into the speed and pressure regulator, lifts the needle valve from its seat, and passes on to move the regulator lever to the low speed position. As air demand continues to decrease, further pressure moves the above lever to the low speed stop screw and passes to the volumetric regulator.

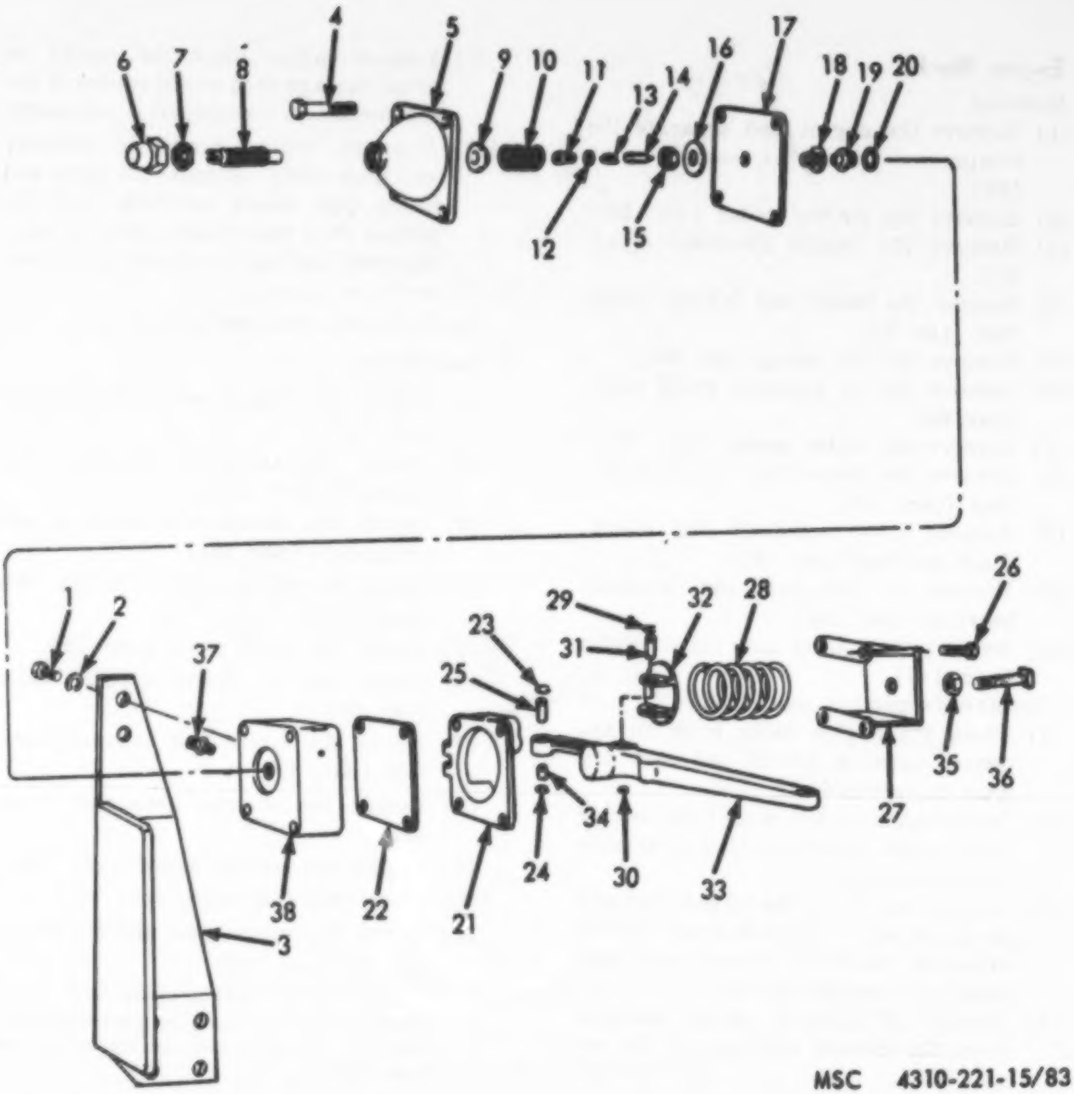
167. Speed and Pressure Regulator

a. Removal. Remove the speed and pressure regulator (par. 101).

b. Disassembly. Disassemble the speed and pressure regulator in the numerical sequence as illustrated on figure 83.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.
(2) Inspect the needle valve and seat for wear. Wear will be indicated by a groove on the needle. Replace as necessary.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MSC 4310-221-15/83

1 Screw, cap, ½–13 x 1 in. (2 rqr)
2 Washer, lock, ½ in. (2 rqr)
3 Bracket
4 Bolt, 7/16–14 x 2¾ in. (4 rqr)
5 Dome
6 Cover
7 Nut, half, ⅝–11
8 Adjusting plunger
9 Spring seat
10 Spring
11 Screw, cap, 5/16–24 x ⅜ in.
12 Washer, 9/16 x 1⅛ x 1/32 in.
13 Spring
14 Needle valve
15 Nut, ⅛–20
16 Washer
17 Diaphragm
18 Retainer
19 Needle valve seat
20 Gasket
21 Plate
22 Diaphragm
23 Snap ring
24 Snap ring
25 Pin
26 Screw, cap, ¼–20 x 1 in. (4 rqr)
27 Bracket
28 Spring
29 Snap ring
30 Snap ring
31 Pin
32 Spring seat
33 Lever
34 Bushing
35 Locknut
36 Stop screw
37 Adapter (2 rqr)
38 Body

Figure 83. Speed and pressure regulator, exploded view.

(3) Inspect the diaphragm for deterioration, cracks, and pin holes. Replace defective diaphragms.
(4) Inspect the springs for weak condition or breaks. Replace defective springs.
(5) Inspect all threaded parts and hardware for breaks and damage. Replace as necessary.

d. Reassembly. Reassemble the speed and pressure regulator in reverse of the numerical sequence as illustrated on figure 83.

e. Installation. Install the speed and pressure regulator (par. 101).

f. Adjustment. Adjust the speed and pressure regulator (par. 101).

Section XVI. AIR INLET UNLOADER VALVE ASSEMBLY

168. General

The unloader valve works in conjunction with the speed and pressure regulator to control the compressor output in accordance with air demand. Air pressure passing from the speed and pressure regulator enters the unloader, and because of the difference in pressure in the two chambers, causes the piston to move in the direction of air travel forcing the valve to the closed position and closing off the air to the compressor.

169. Unloader Valve

a. Removal.
(1) Remove the air inlet elbow from the top of the unloader body (par. 63).
(2) Remove the reducing valve (par. 103).
(3) Remove the unloader valve as ininstructed on figure 84.

b. Disassembly. Disassemble the unloader valve in the numerical sequence as illustrated on figure 85.

c. Cleaning, Inspection, and Repair.
(1) Clean all parts with an approved cleaning solvent.
(2) Inspect the diaphragm for cuts, breaks, pin holes, and deterioration. Replace defective diaphragm.
(3) Inspect the cover and valve bodies for cracks, distortion, and damage mating surfaces. Replace damaged parts as necessary.
(4) Inspect the sleeve bearings in the unloader valve body for scoring, wear, and pitting. Replace as required.
(5) Inspect the unloader valve seat for pitting and distortion. Replace as required.
(6) Inspect the orifice for dirt and clogging. Remove foreign matter from orifice.
(7) Inspect remaining parts for wear and damage. Replace defective parts as necessary.

d. Reassembly.
(1) Reassemble the unloader valve in the reverse of the numerical sequence as illustrated on figure 85.
(2) Adjust the unloader valve (fig. 58).

e. Installation.
(1) Install the unloader valve in reverse of the instructions on figure 84.
(2) Install the reducing valve (par. 103).
(3) Install the air inlet elbow (par. 63).

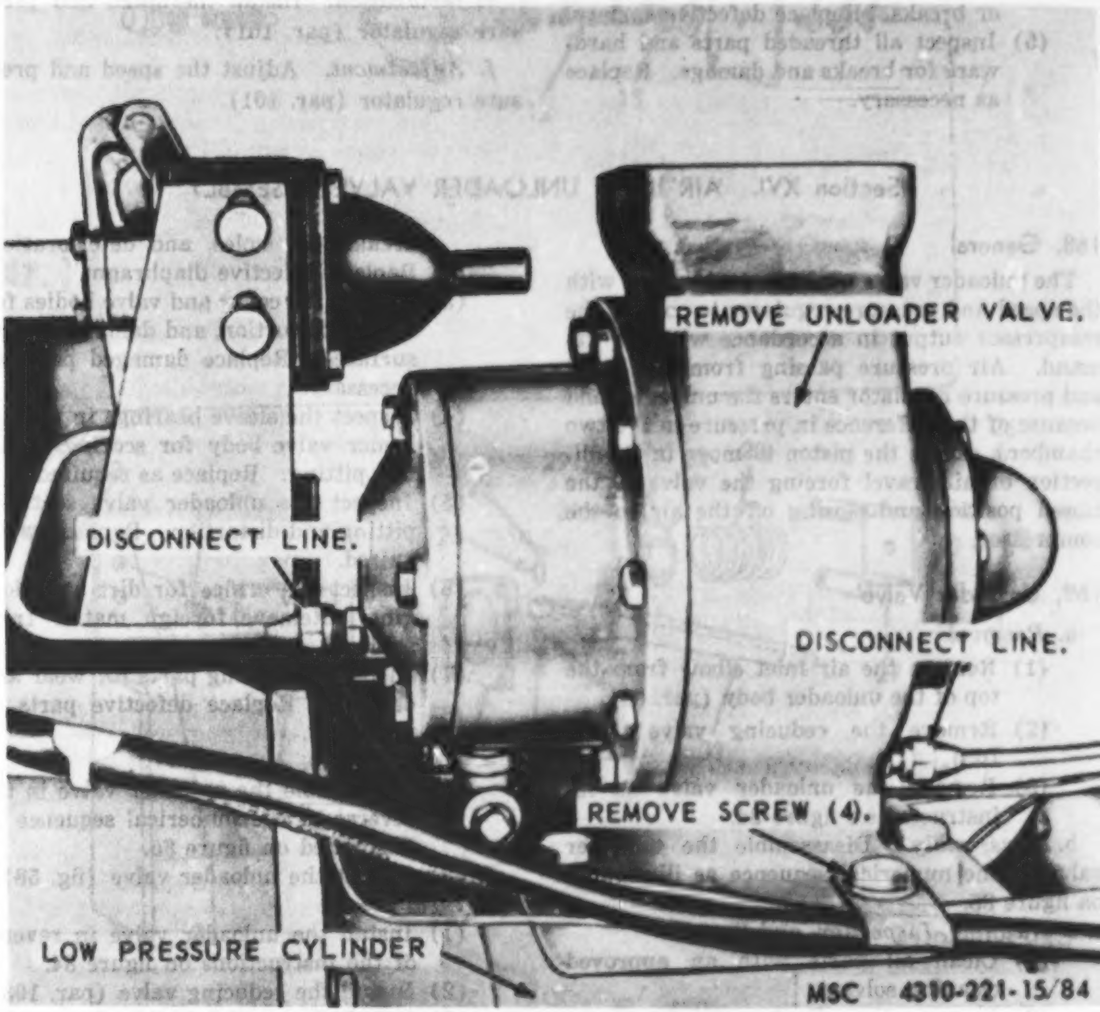
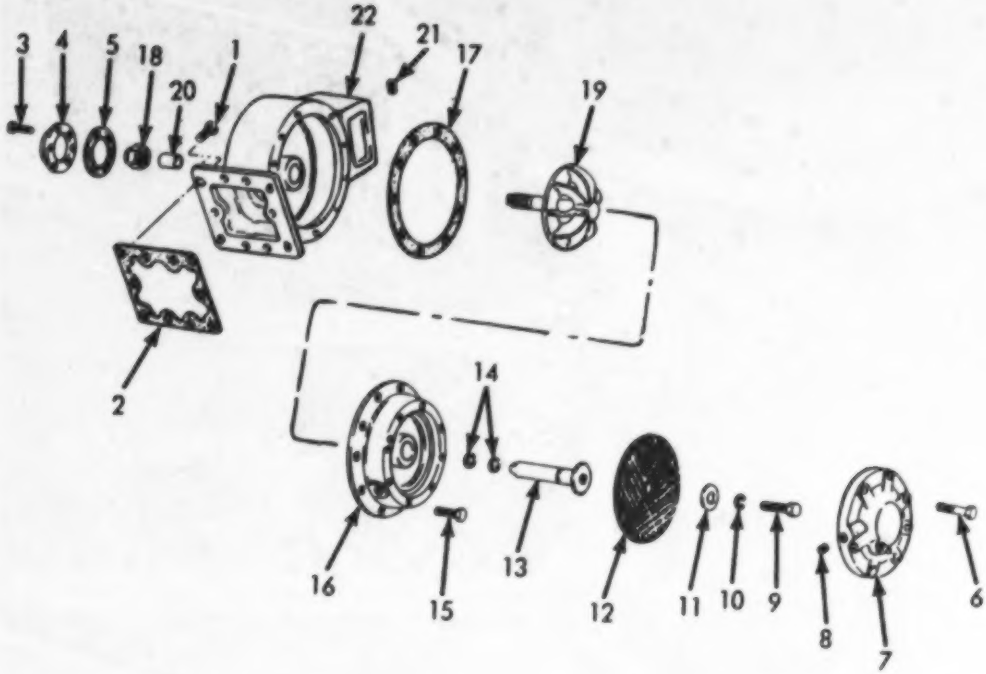

REMOVE UNLOADER VALVE.
DISCONNECT LINE.
DISCONNECT LINE.
REMOVE SCREW (4).
LOW PRESSURE CYLINDER
MSC 4310-221-15/84

Figure 84. Unloader valve—removal and installation.



MSC 4310-221-15/85

1	Screw, cap, ½-13 x 1¼ in. (6 rqr)
2	Gasket
3	Screw, cap, ⅜-16 x 1 in. (6 rqr)
4	Cover
5	Gasket
6	Screw, cap, ⅜-16 x 1 in. (6 rqr)
7	Cover
8	Plug, ⅛-27
9	Screw, cap, ⅜-16 x ⅞ in.
10	Lockwasher
11	Plate
12	Diaphragm
13	Piston
14	Ring (2 rqr)
15	Screw, cap, ⅜-16 x 1 in. (6 rqr)
16	Diaphragm body
17	Gasket
18	Nut, ⅛ thd size
19	Valve
20	Bushing
21	Orifice plug
22	Unloader body

Figure 85. Unloader valve—exploded view.

Section XVII. OIL SEPARATOR ASSEMBLY

170. General

The oil separator assembly is located in the air receiver tank. Servicing the oil separator is by replacement of the element assembly. In normal operation, replacement of the element is required approximately every 2 or 3 years. The element replacement time is indicated when the discharge air shows excess oil and when oil consumption becomes higher than normal.

171. Oil Separator

a. Removal.

(1) Remove the service valves (par. 104).

(2) Remove the oil separator assembly as instructed on figure 86.

b. Disassembly. Disassemble the oil separator assembly in the numerical sequence as illustrated on figure 87.

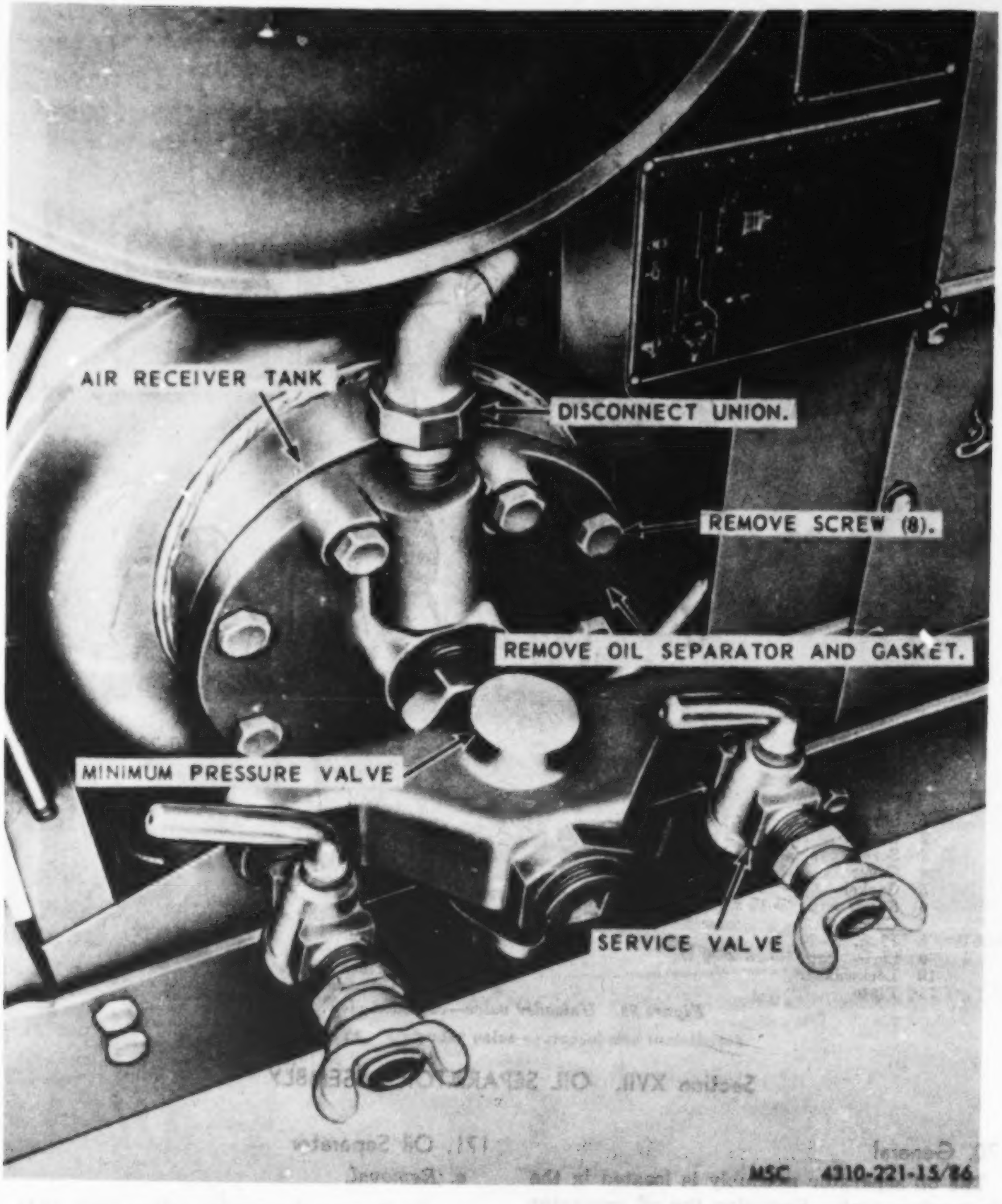
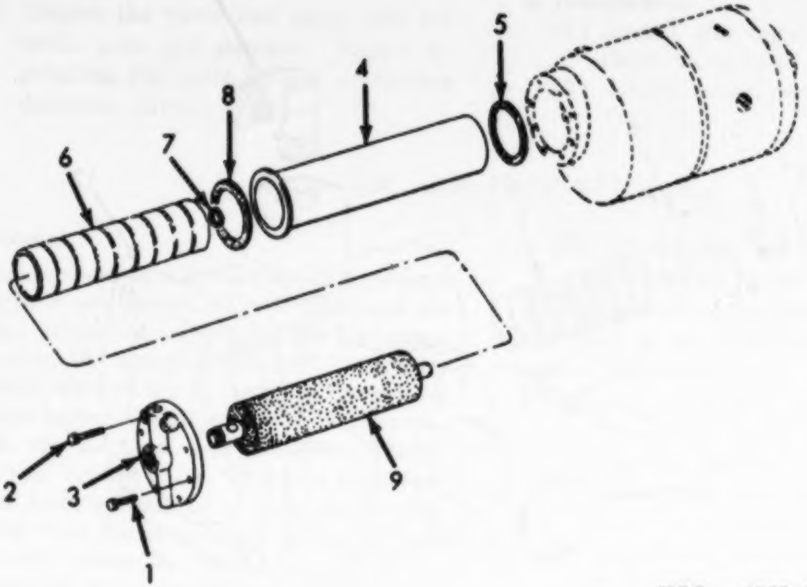

AIR RECEIVER TANK
DISCONNECT UNION.
REMOVE SCREW (8).
REMOVE OIL SEPARATOR AND GASKET.
MINIMUM PRESSURE VALVE
SERVICE VALVE
MSC 4310-221-15/86

Figure 86. Oil separator assembly, removal and installation.

c. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent.

(2) Inspect all parts for breaks and damage. Replace all defective parts.



1 Screw, cap, ⅝–11 x 2⅛ in. (6 rqr)
2 Screw, cap, ⅝–11 x 1¾ in. (2 rqr)
3 Cover
4 Shell
5 Gasket
6 Filter assembly
7 O-ring
8 Gasket
9 Screen assembly

Figure 87. Oil separator assembly, exploded view.

(3) Inspect the oil separator element for accumulation of dirt and serviceable condition. Replace an unserviceable element.

d. Reassembly. Reassemble the oil separator assembly in the reverse of the numerical sequence as illustrated on figure 87.

e. Installation.

(1) Install the oil separator assembly in reverse of the instructions on figure 86.

(2) Install the service valves (par. 104).

Section XVIII. HIGH PRESSURE DISCHARGE CHECK VALVE ASSEMBLY

172. General

The high pressure discharge check valve is located on the high pressure cylinder. This valve, which is lightly springloaded, prevents any accumulation of lubricating oil from entering the high pressure cylinder from the air receiver tank. While operating, the air delivery opens the piston in the valve and allows the air to pass into the air receiver tank.

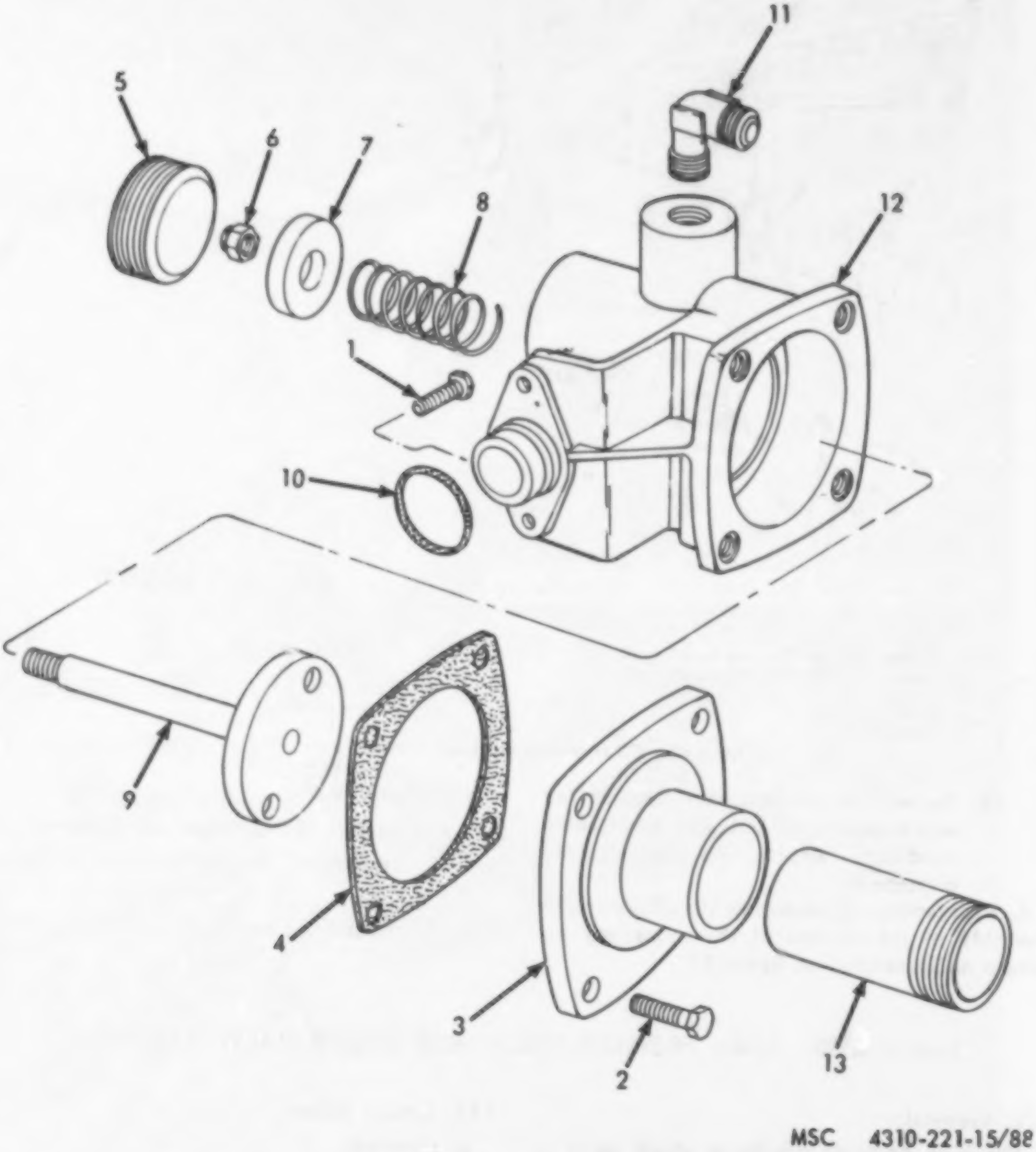
173. Check Valve

a. Removal.

(1) Remove the temperature sending switch (par. 81).

(2) Remove the high pressure discharge check valve (par. 136).

b. Disassembly. Disassemble the high pressure discharge check valve in the numerical sequence as illustrated on figure 88.



MSC 4310-221-15/88

1 Screw, cap, ⅜–16 x 1 in. (2 rqr)
2 Screw, cap, ⅜–16 x 1 in. (4 rqr)
3 Cover
4 Gasket
5 Plug
6 Nut, special
7 Washer
8 Spring
9 Disk
10 O-ring
11 Elbow, 90°
12 Body
13 Pipe

Figure 88. High pressure discharge check valve—exploded view.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent.

(2) Inspect the valve and valve seat for nicks, pits, and damage. Repair by grinding the valve in seat or replace defective parts.

d. Reassembly. Reassemble the high pressure discharge check valve in the reverse of the numerical sequence as illustrated on figure 87.

e. Installation

(1) Install the high pressure discharge check valve (par. 136).

(2) Install the temperature sending switch (par. 81).

Section XIX. AIR RECEIVER TANK

174. General

The air receiver tank houses the oil separator assembly, the compressor oil level gage, and the filler cap. When the air leaving the high-pressure stage of the compressor enters the air receiver tank, most of the oil drops to the bottom of the tank before the air enters the oil separator on its way to the discharge outlet. The oil temperature bypass valve, which is connected to the air receiver tank by tubing, allows compressor oil from the air receiver tank to bypass the oil cooler, when the oil is cold, and go directly through the compressor oil filter and oil pump back into the compressor. When the oil temperature rises, the valve closes the bypass line, directing the oil through the oil cooler before it enters the filter and oil pump.

175. Air Receiver Tank

a. Removal.

(1) Drain the oil from the air receiver tank (par. 29).

(2) Remove the fuel tank (par. 61).

(3) Remove the oil level gage (par. 80).

(4) Remove the high-pressure discharge check valve (par. 136).

(5) Remove the service valves (par. 104).

(6) Remove the compressor oil temperature gage sending unit (par. 81).

(7) Remove the hose rack (par. 106).

(8) Remove the oil separator (par. 171).

(9) Remove the air receiver tank as instructed on figure 89.

b. Disassembly. Disassemble the air receiver tank in the numerical sequence as illustrated on figure 90.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent.

(2) Inspect all parts for breaks and damage. Replace defective parts.

(3) Inspect the air receiver tank for rust, corrosion, stripped threads, and other damage. Replace defective air receiver tank.

d. Reassembly. Reassemble the air receiver tank in the reverse of the numerical sequence as illustrated on figure 90.

e. Installation.

(1) Install the air receiver tank in reverse of the instructions on figure 89.

(2) Install the oil separator (par. 171).

(3) Install the compressor oil temperature gage sending unit (par. 81).

(4) Install the service valves (par. 104).

(5) Install the high-pressure discharge check valve (par. 136).

(6) Install the oil level gage (par. 80).

(7) Install the fuel tank (par. 61).

(8) Install the hose rack (par. 106).

(9) Fill the air receiver (par. 29).

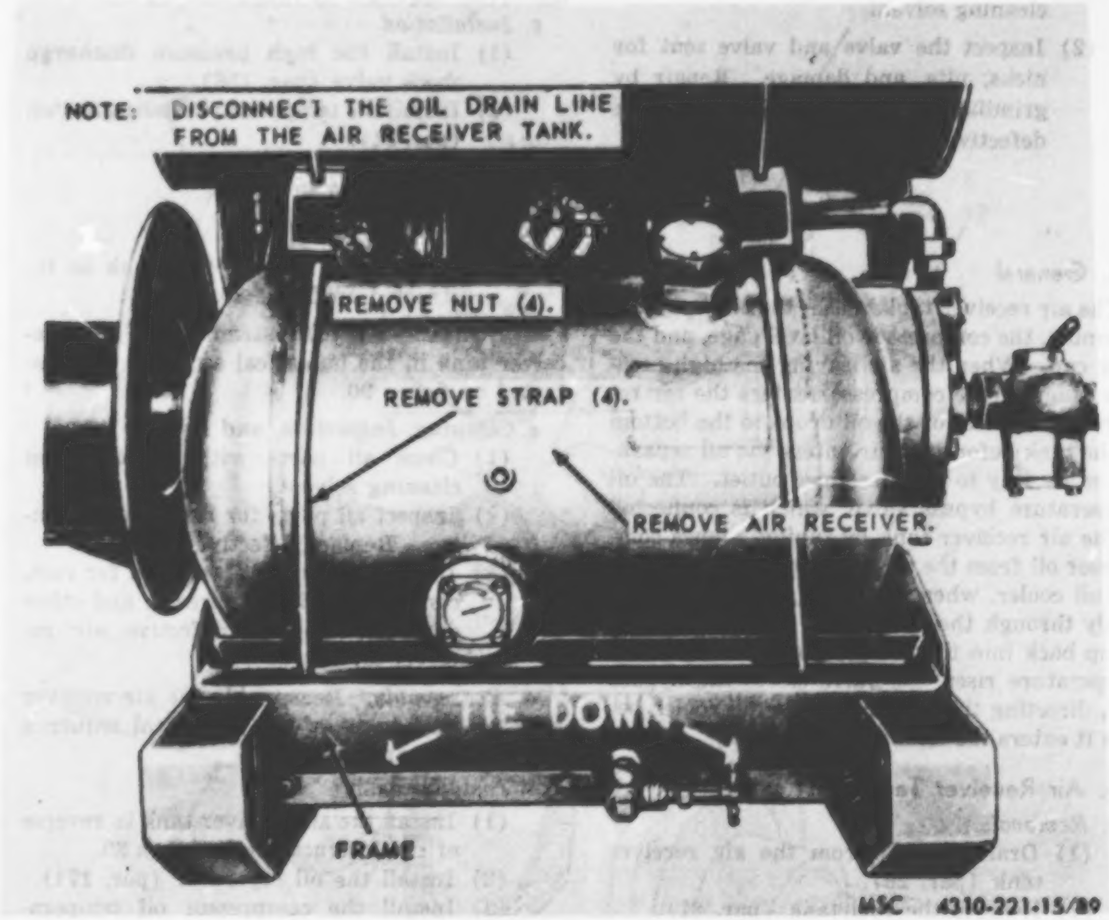
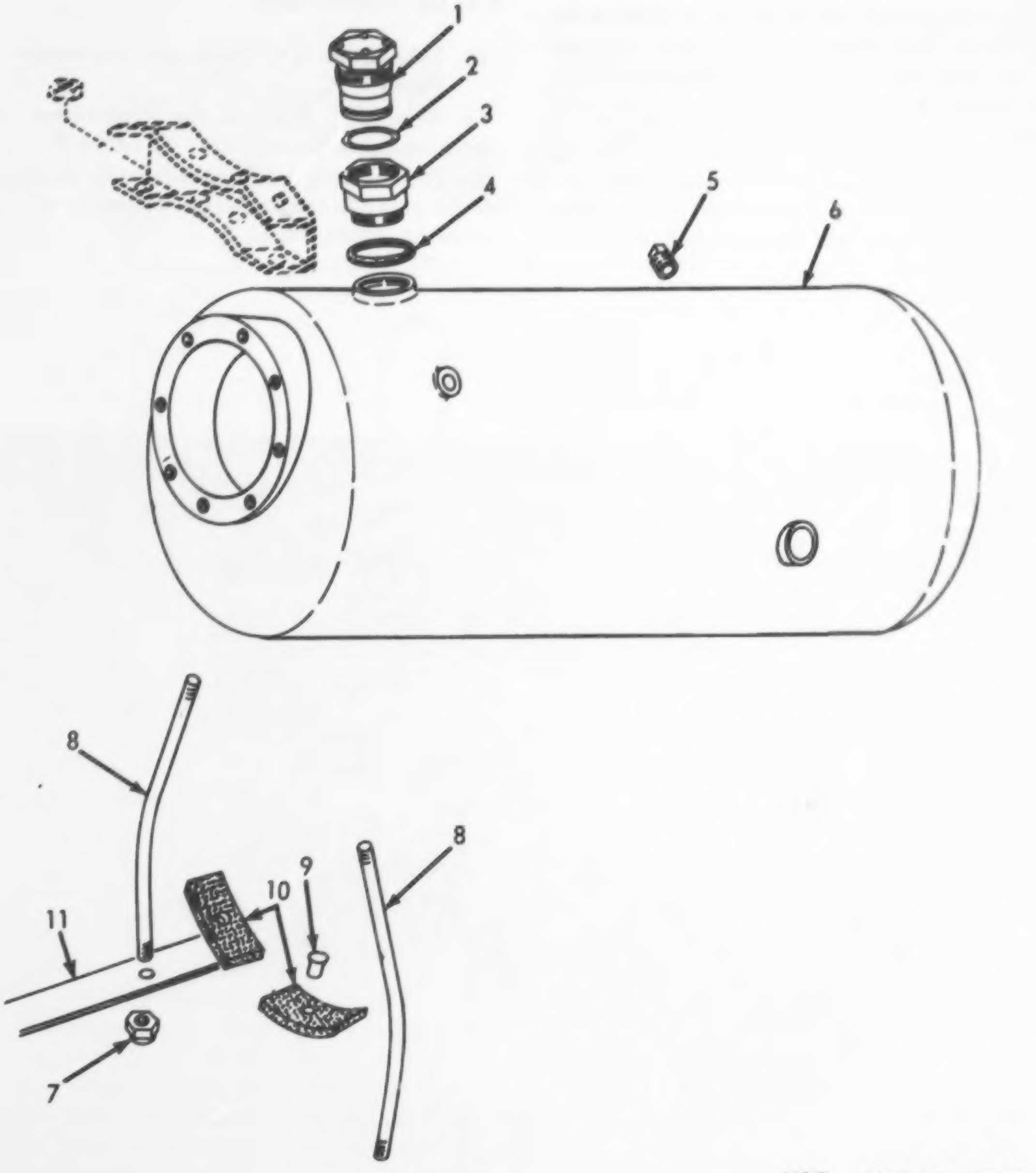

NOTE: DISCONNECT THE OIL DRAIN LINE FROM THE AIR RECEIVER TANK.
REMOVE NUT (4).
REMOVE STRAP (4).
REMOVE AIR RECEIVER.
TIE DOWN
FRAME
MSC 4310-221-15/89

Figure 89. Air receiver tank—removal and installation.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MSC 4310-221-15/90

1 Oil filler plug
2 O-ring
3 Adapter
4 Gasket
5 Plug, ½-14
6 Air receiver tank
7 Nut, self-locking, ½-20 (4 rqr)
8 Strap (4 rqr)
9 Rivet (4 rqr)
10 Cushion (4 rqr)
11 Frame

Figure 90. Air receiver tank—exploded view.

Section XX. COMPRESSOR LUBRICATING SYSTEM

176. General

The compressor oil pump is a positive-displacement, gear-type, dual-unit pump mounted on the rear end of the high pressure cylinder. The pump is driven by a spline in the rotor shaft. The main pump forces filtered oil through ports in the cylinder walls to the rotors where it is mixed with the compressor air. The smaller pump is a scavenger pump which drains the oil that has accumulated in the bottom of the oil separator assembly, and returns it to the receiver tank.

177. Lubrication Oil Pump and Scavenger Pump

a. Removal. Remove the compressor oil pump assembly as instructed on figure 91.

b. Disassembly. Disassemble the compressor oil pump in the numerical sequence as illustrated on figure 92.

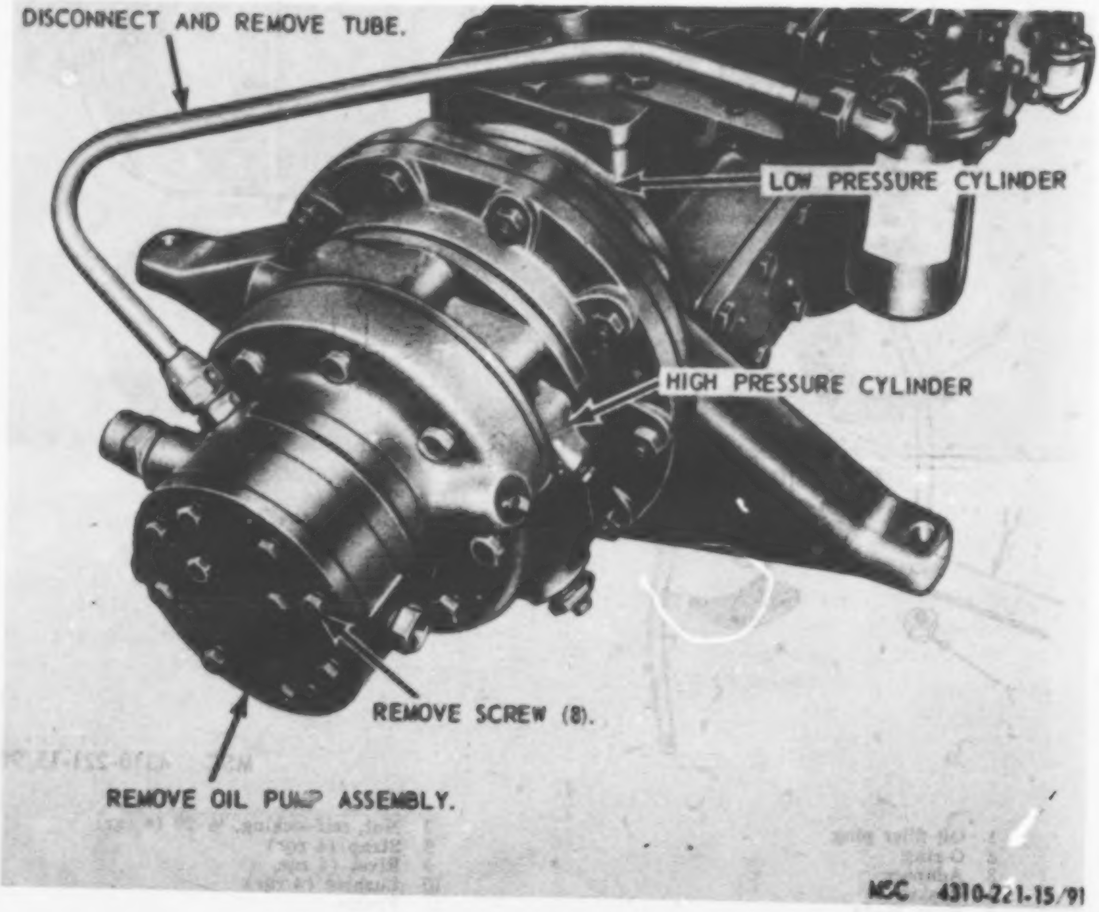
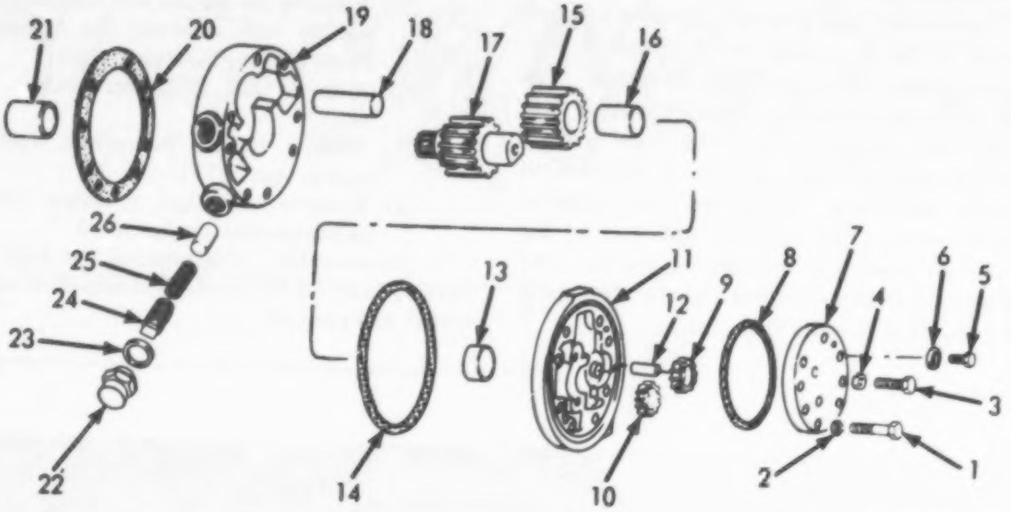

DISCONNECT AND REMOVE TUBE.
LOW PRESSURE CYLINDER
HIGH PRESSURE CYLINDER
REMOVE SCREW (8).
REMOVE OIL PUMP ASSEMBLY.
MEC 4310-221-15/91

Figure 91. Compressor oil pump assembly—removal and installation.



MSC 4310-221-15/92

1	Screw, cap, ⅜–16 x 3¾ in. (8 rqr)	14	O-ring
2	Washer, flat, ⅜ in. (8 rqr)	15	Gear
3	Screw, cap, ⅜–16 x 1 in. (2 rqr)	16	Bearing
4	Washer, flat, ⅜ in. (2 rqr)	17	Gear
5	Screw, cap, ¼–20 x 2 in.	18	Shaft
6	Washer, flat, ¼ in.	19	Body
7	Cover	20	Gasket
8	O-ring	21	Bushing
9	Gear	22	Nut
10	Gear	23	Gasket
11	Body	24	Adjuster
12	Shaft	25	Spring
13	Bushing	26	Valve

Figure 92. Compressor oil pump—exploded view.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent.

(2) Inspect the pump gears for nicks, burrs, pits, chipped teeth, and other damage. Replace defective gears.

(3) Inspect all sleeve bearings and bushings for scoring, wear, defects, and damage. Replace defective bearings and bushings.

(4) Inspect all other parts for defects and damage. Replace all defective parts.

d. Reassembly. Reassemble the compressor oil pump assembly in the reverse of the numerical sequence as illustrated on figure 92.

e. Installation. Install the compressor oil pump assembly in reverse of the instructions on figure 91.

f. Oil Pump Bypass Valve Adjustment.

(1) Remove the ⅛-inch pipe plug in the oil gallery of the high pressure cylinder, and install the 200 psi pressure gage.

(2) Run the unit at rated speed and 100 psi air discharge pressure, until the temperature of the oil is 100° F.

(3) Remove the nut (22, fig. 92) and adjust the pump bypass valve to give a pump discharge pressure of 90 to 110 psi.

(4) Install the nut (22).

Section XXI. HIGH PRESSURE CYLINDER ASSEMBLY

118. General

Compressed air from the low pressure cylinder enters the high pressure cylinder through the high pressure intake manifold and is further compressed to its maximum pressure. The air is discharged through the check valve into the air receiver tank. The compressed air entering the high pressure cylinder is mixed with oil, and additional oil enters the cylinder through ports in the cylinder wall to cool the air and lubricate the compressor parts. The oil passes with the air into the air receiver tank where the oil separates from the air.

179. High Pressure Cylinder

a. Removal.

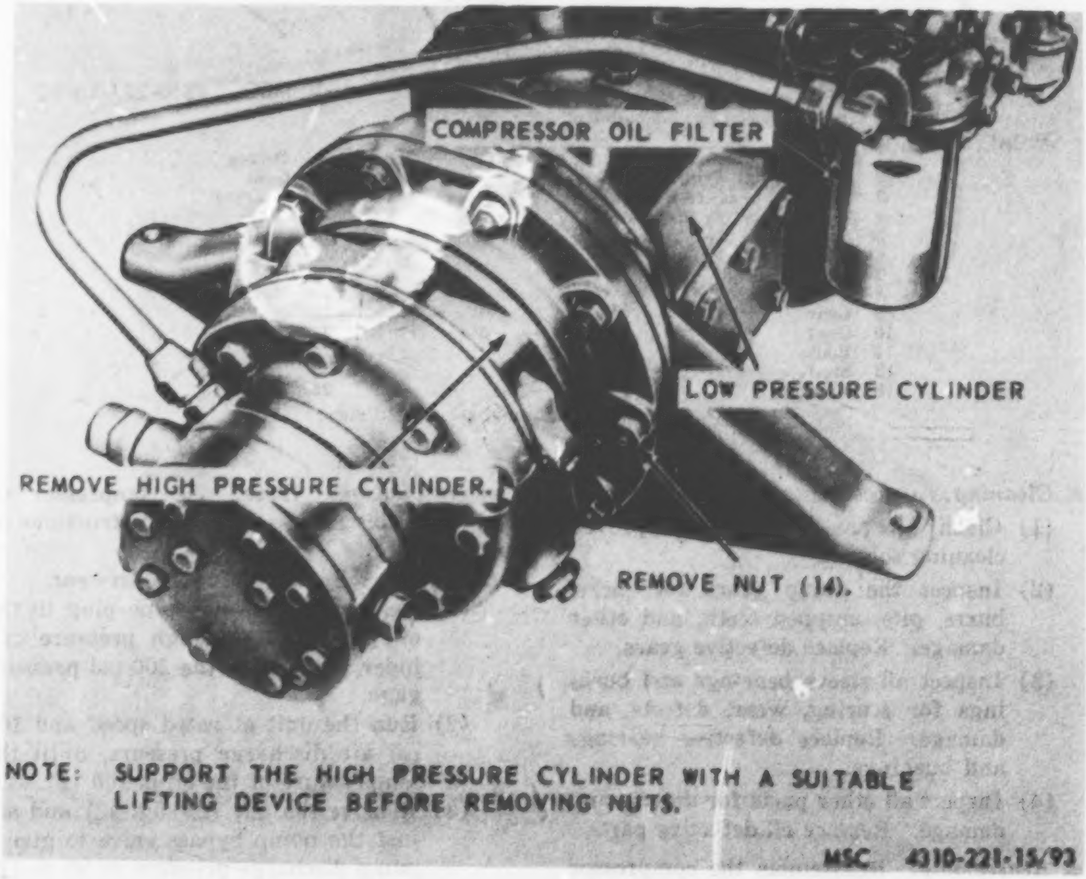
(1) Remove the engine and compressor assembly and separate the compressor from the engine (par. 136).

(2) Remove the unloader valve (par. 169).

(3) Remove the oil pump and scavenger pump (par. 177).

(4) Remove the high pressure cylinder as instructed on figure 93.

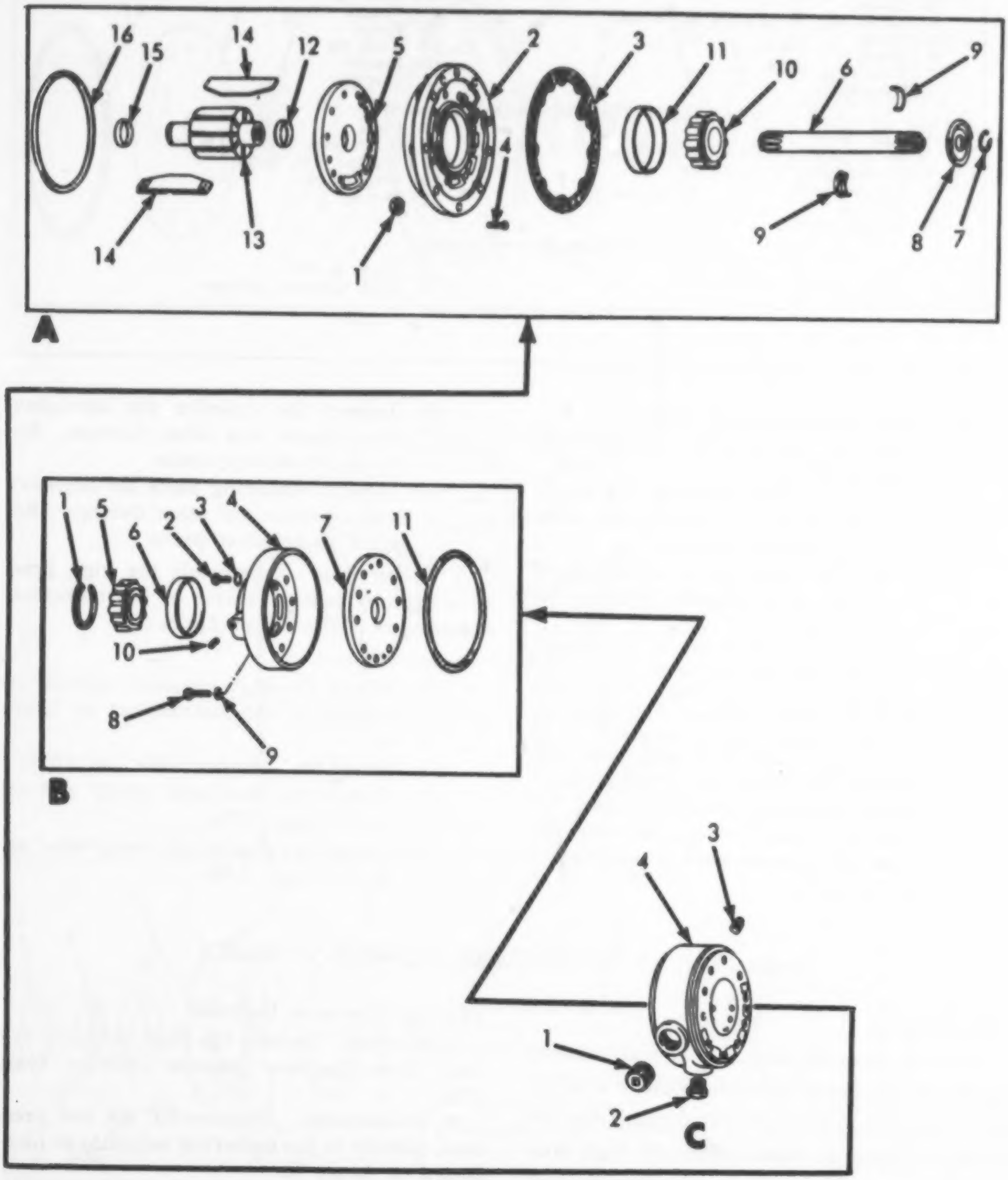
b. Disassembly. Disassemble the high pressure cylinder in the numerical sequence as illustrated on figure 94.



NOTE: SUPPORT THE HIGH PRESSURE CYLINDER WITH A SUITABLE LIFTING DEVICE BEFORE REMOVING NUTS.

MSC 4310-221-15/93

Figure 93. High pressure cylinder, removal and installation.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B
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1
2
C

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Figure 94. High pressure cylinder, exploded view.

A—High pressure rotor and vane assembly

1 Nut, ½-13 (10 rqr)
2 Bearing housing
3 Gasket
4 Screw, cap, ½-13 x 1¾ in. (8 rqr)
5 Plate
6 Shaft
7 Snap ring
8 Spacer
9 Spacer support half (2 rqr)
10 Bearing
11 Bearing race
12 Spacer
13 Rotor
14 Vane set
15 Spacer
16 O-ring

B—High pressure end housing assembly

1 Snap ring
2 Screw, cap, ½-13 x 1¾ in (8 rqr)
3 Washer, flat, ½ in. (8 rqr)
4 End housing
5 Bearing
6 Bearing race
7 Plate
8 Screw, cap, ½-13 x 1¾ in.
9 Washer, flat, ½ in.
10 Plug (2 rqr)
11 O-ring

C—High pressure cylinder

1 Plug
2 Bushing
3 Plug, ¼-18
4 High pressure cylinder

Figure 94—Continued.

---

c. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent.

(2) Inspect the roller bearings for pitted, corroded, or cracked rollers and races. Replace defective bearings.

(3) Inspect the rotor for scratches, nicks, burrs, and other damage. Replace defective rotor.

Note. When vanes are to be replaced, make sure that the driving or trailing tips of the rotor slots are not razor-sharp. They should be slightly rounded. This easily can be done by hand using a fine-grained stone to produce a radius of one sixty-fourth inch.

(4) Inspect the vanes for pitted or laminated edges and nicks. Inspect for chipped, cracked, or scarred ends. Replace all vanes as a set if one or more are defective.

(5) Inspect the cylinder for scratches, pits, cracks, and other damage. Replace defective cylinder.

(6) Inspect remaining parts for excessive wear, breaks, and other damage. Replace all defective parts.

d. Reassembly. Reassemble the high pressure cylinder in the reverse of the numerical sequence as illustrated on figure 94.

e. Installation.

(1) Install the high pressure cylinder in reverse of the instructions on figure 93.

(2) Install the unloader valve (par. 169).

(3) Install the scavenger pump and oi pump (par. 177).

(4) Install the engine and compressor assembly (par. 136).

Section XXII. LOW PRESSURE CYLINDER ASSEMBLY

180. General

Air flows through the air filter and unloader valve into the lower pressure cylinder where it is compressed and forced out through the low pressure discharge manifold into the high pressure cylinder. Compressor oil enters the cylinder through ports in the cylinder wall and mixes with the air to cool the air and lubricate the parts.

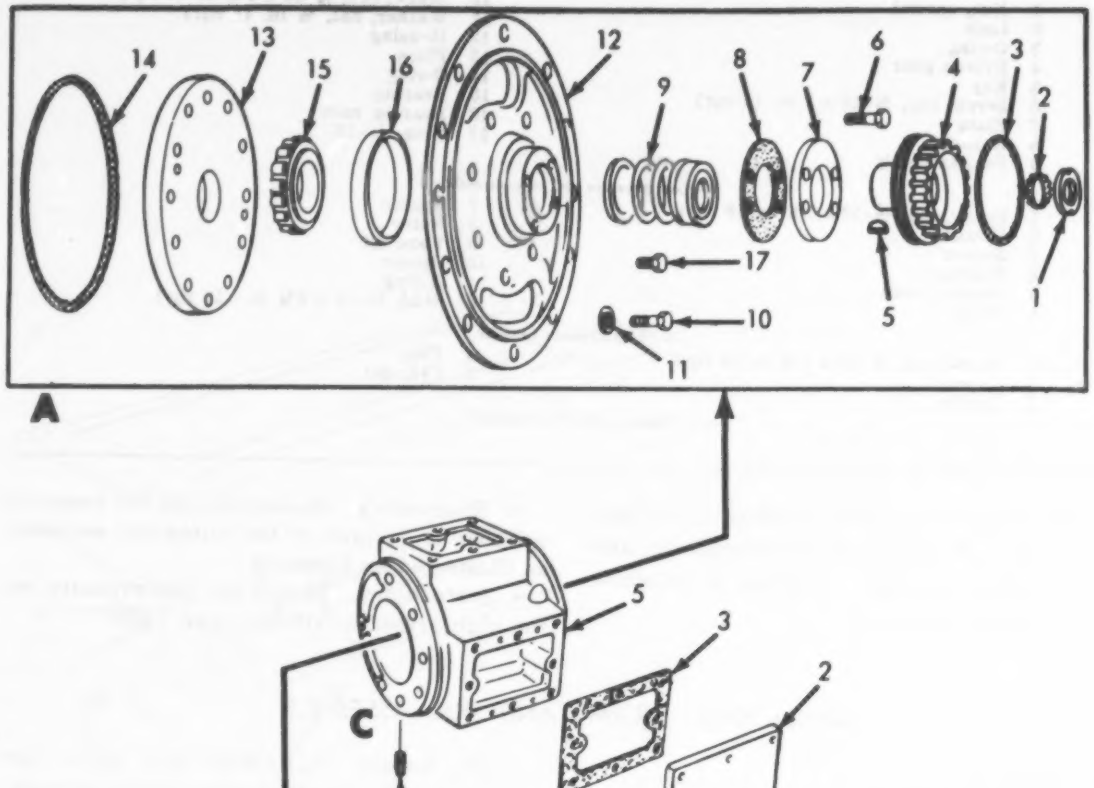
181. Low Pressure Cylinder

a. Removal. Remove the high pressure cylinder from the low pressure cylinder (par 179).

b. Disassembly. Disassemble the low pressure cylinder in the numerical sequence as illustrated on figure 94.

c. Cleaning, Inspection, and Repair.

(1) For cleaning, inspection, and repai of low pressure cylinder, refer to paragraph 179*c*.


14
13
15
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A
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3
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C
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5
7
12
9
B

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Figure 95. Low pressure cylinder, exploded view.

A—Drive housing and coupling gear assembly

1 Nut, special
2 Lock
3 O-ring
4 Driven gear
5 Key
6 Screw, cap, ⅜–16 x 1 in. (4 rqr)
7 Plate
8 Gasket
9 Seal assembly
10 Screw, cap, ½–13 x 1¾ in. (8 rqr)
11 Washer, flat, ½ in. (8 rqr)
12 Housing
13 Plate
14 O-ring
15 Bearing
16 Bearing race
17 Plug, ¼–18

B—Low pressure and vane assembly

1 Screw, cap, ½–13 x 1¾ in. (8 rqr)
2 Housing
3 Spacer
4 Bearing
5 Bearing race
6 Plate
7 Spacer
8 Rotor
9 Vane set
10 Spacer
11 O-ring
12 Stud, ½–13 x 2¼ in. (10 rqr)

C—Low pressure cylinder

1 Screw, cap, ½–13 x 1¼ in. (6 rqr)
2 Cover
3 Gasket
4 Plug
5 Cylinder

Figure 95—Continued.

(2) Inspect the drive coupling for broken or damaged teeth, excessive wear, and other damage. Replace a defective drive coupling.

d. Reassembly. Reassemble the low pressure cylinder in reverse of the numerical sequence as illustrated on figure 95.

e. Installation. Install the low pressure on the high pressure cylinder (par. 179).

Section XXIII. FRAME AND SKID ASSEMBLY

182. General

The compressor frame assembly consists of two steel side members, a front and rear steel crossmember and two skid runners. Mounting brackets are attached to the frame assembly for mounting the compressor and engine assembly, radiator and oil cooler, air receiver, and fuel tanks.

183. Frame and Skid

a. Removal and Disassembly.

(1) Remove the radiator and oil cooler (par. 143).

(2) Remove the compressor and engine assembly (par. 136).

(3) Remove the fuel tank (par. 61).

(4) Remove the air receiver-oil separator tank (par. 175).

(5) Remove the bottom pans (par. 57).

(6) Disassemble the compressor frame assembly in the numerical sequence as illustrated on figure 96.

b. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent.

(2) Inspect the frame and skids for cracks, bends, breaks, defective hardware, and other damage. Replace defective hardware. Replace frame and skids or repair by welding cracks and breaks.

c. Painting. Remove all rust, corrosion, and dirt from the frame and skid assembly, and paint in accordance with instructions contained in TM 9–213.

d. Reassembly and Installation.

(1) Reassemble the frame and skid assembly in the reverse of the numerical sequence as illustrated on figure 96.

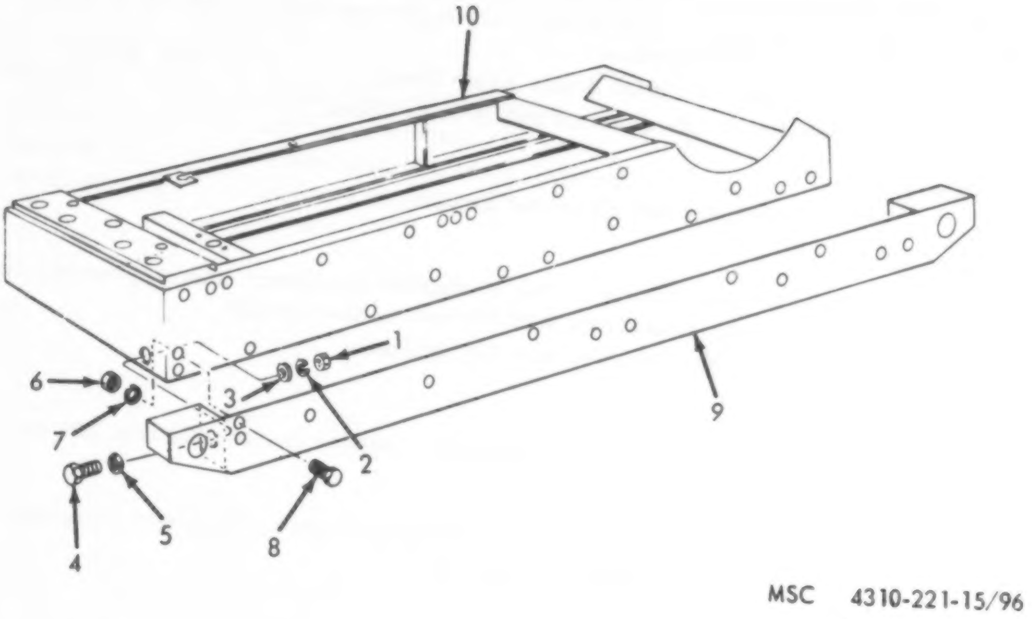
(2) Install the bottom pans (par. 57).

(3) Install the air receiver-oil separator tank (par. 175).

(4) Install the fuel tank (par. 61).

(5) Install the engine and compressor assembly (par. 136).

(6) Install the radiator and oil cooler assembly (par. 143).


10
1
6
3
7
9
2
5
8
4
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1 Nut, ½-13 (4 rqr)
2 Lockwasher, ½ in. (4 rqr)
3 Washer, ½ in. (4 rqr)
4 Screw, cap, ½-13 x 1½ in. (4 rqr)
5 Washer, ½ in. (4 rqr)
6 Nut, ⅝-11 (14 rqr)
7 Lockwasher, ⅝ in. (14 rqr)
8 Screw, cap, ⅝-11 x 1½ in. (14 rqr)
9 Skid runner (2 rqr)
10 Frame

Figure 96. Compressor frame—exploded view.

APPENDIX I

REFERENCES

1. Dictionaries of Terms and Abbreviations

AR 320–5	Dictionary of United States Army Terms.
AR 320–50	Authorized Abbreviations and Brevity Codes.

2. Field Maintenance

TM 5–764	Electric Motor and Generator Repair.

3. Fire Protection

TM 5–687	Repairs and Utilities: Fire Protection Equipment and Appliances; Inspections, Operations, and Preventive Maintenance.
TM 9–1799	Ordnance Maintenance: Fire Extinguishers.

4. Lubrication

LO 5–4310–221–15	Compressor, Rotary: Skid Mounted; Gasoline Driven; 125 cfm, 100 psi.

5. Painting and Preservation

TB ENG 60	Preservation and Painting of Serviceable Corps of Engineers Equipment.
TM 9–213	Painting Instructions for Field Use.

6. Preventive Maintenance

AR 750–5	Organization, Policies and Responsibilities for Maintenance Operations.
TB ENG 347	Winterization Techniques for Engineer Equipment.
TM 9–207	Operation and Maintenance of Ordnance Materiel in Extreme Cold Weather (0° to –65° F.).
TM 9–214	Inspection, Care, and Maintenance of Antifriction Bearings.
TM 9–6140–200–15	Storage Batteries, Lead-Acid Type.
TM 38–750	The Army Equipment Records System and Procedures.

7. Publication Indexes

DA Pam 108–1	Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.
DA Pam 310–1	Index of Administrative Publications.
DA Pam 310–2	Index of Blank Forms.
DA Pam 310–3	Index of Training Publications.
DA Pam 310–4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310–5	Index of Graphic Training Aids and Devices.
DA Pam 310–25	Index of Supply Manuals—Corps of Engineers.

8. Radio Interference Suppression

TM 11–483	Radio Interference Suppression.

9. Shipment and Limited Storage

AR 743–505	Limited Storage of Engineers Mechanical Equipment.
TM 9–200	General Packaging Instructions for Ordnance General Supplies.
TM 38–230	Preservation, Packaging, and Packing of Military Supplies and Equipment.

10. Supply Publications

SM 10–1–C4–1	Petroleum, Petroleum-Base Products, and Related Material.
TM 5–4310–221–20P	Organizational Maintenance Repair Parts and Special Tool Lists.
TM 5–4310–221–35P	Field and Depot Maintenance Repair Parts and Special Tool Lists.

11. Training Aids

FM 5–25	Explosives and Demolition.
FM 21–5	Military Training.
FM 21–6	Techniques of Military Instruction.
FM 21–30	Military Symbols.

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APPENDIX II

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

1. General

This appendix contains explanations of all maintenance and repair functions authorized for the various echelons. Section II contains the maintenance allocation chart.

2. Maintenance

Maintenance is any action taken to keep material in a serviceable condition or to restore it to serviceability when it is unserviceable. Maintenance of material includes the following:

a. Service. To clean, preserve, and replenish fuel and lubricants.

b. Adjust. To regulate periodically to prevent malfunction.

c. Inspect. To verify serviceability and detect incipient electrical or mechanical failure by scrutiny.

d. Test. To verify serviceability and detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, and the like.

e. Replace. To substitute serviceable assemblies, subassemblies, and parts for unserviceable components.

f. Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to, inspecting, cleaning, preserving, adjusting, replacing, welding, riveting, and straightening.

g. Aline. To adjust two or more components of an electrical system so that their functions are properly synchronized.

h. Calibrate. To determine check or rectify the graduation of an instrument, weapon or weapons system, or components of a weapons system.

i. Overhaul. To restore an item to completely serviceable condition as prescribed by serviceability standards developed and published by heads of technical services. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

3. Explanation of Columns

a. Functional Group. The functional group is a numerical group set up on a functional basis. The applicable Functional Grouping Indexes (obtained from the Corps of Engineers Functional Grouping Indexes) are listed on the Maintenance Allocation Chart in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each other.

b. Components and Related Operation. This column contains the functional grouping index heading, subgroup headings, and a brief description of the part starting with the noun name. It also designates the operations to be performed such as service, adjust, inspect, test, replace, repair, and overhaul.

c. Echelons of Maintenance. This column contains the various echelons of maintenance by number designation. An X placed in the appropriate echelon column and in line with an indicated maintenance function authorizes that echelon to perform the function. The X indicates the lowest echelon responsible for performing the function, but does not necessarily indicate repair parts stockage at that level. Higher echelons are authorized to perform the indicated functions of lower echelons.

d. Remarks. This column lists specific maintenance functions, special tools, cross-references, instructions, and the like pertinent to the operation being performed.

Section II. MAINTENANCE ALLOCATION CHART

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
	PART I						
	Individual repair parts and assemblies common to all serial ranges are listed in this section.						
	PART II						
	Individual repair parts and assemblies applicable to serial range No. 125CR22346 through 125CR22545 only are listed in this section.						
	PART III						
	Individual repair parts and assemblies applicable to serial range No. 125CR24901 through 125CR25400 only are listed in this section.						
	PART I						
01	ENGINE						
0100	Engine Assembly						
	Gasket set						
	Replace		X				
0101	Cylinder Head						
	Head, cylinder						
	Replace		X				
0102	Crankshaft						
	Bearings, sleeve; seals						
	Replace				X		
	Crankshaft						
	Replace				X		
	Pulley						
	Replace			X			
0103	Flywheel Assembly						
	Flywheel; ring gear; housing						
	Replace				X		
0104	Pistons, Connecting Rods						
	Bearings, sleeve; pistons; rings; pins; retainers; bearings						
	Replace				X		
	Rods, connecting						
	Replace				X		
	Repair				X		
0105	Valves, Camshafts, and Timing System						
	Guides, valve stem; springs; locks; push rods; cover						
	Replace			X			
	Inserts, seat; valves						
	Replace			X			
	Repair			X			
	Lifters, valve						
	Adjust		X				
	Replace			X			
	Camshaft; washer, thrust; bearings, sleeve; gears, timing						
	Replace				X		
0108	Engine Lubrication System						
	Pump assembly, oil						
	Replace			X			
	Valve, oil pressure relief						
	Replace		X				
	Cap, oil fill; gage, oil level						
	Replace	X					
	Pan, oil						
	Replace			X			

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
0110	Manifolds						
	Manifolds						
	Replace	--	X				
03	FUEL SYSTEM						
0301	Carburetor						
	Carburetor						
	Adjust	--	X				
	Replace	--	X				
	Gasket, bowl						
	Replace	--	X				
0304	Air Cleaner						
	Band; clamps; bracket						
	Replace	--	X				
0306	Tanks, Lines, Fittings						
	Saddle; lining; straps; fittings; strip						
	Replace	--	X				
	Lines						
	Replace	--	X				
	Repair	--	X				
0308	Engine Speed Governor						
	Governor						
	Adjust	--	X				
	Replace	--	X				
	Repair	--	--	X			
	Rod, control						
	Replace	--	X				
0312	Accelerator, Throttle or Choke Controls						
	Cable, speed; wire, choke; rod						
	Replace	--	X				
04	EXHAUST SYSTEM						
0401	Muffler and Pipes						
	Muffler; cap						
	Replace	--	X				
05	COOLING SYSTEM						
0501	Radiator						
	Cap, radiator						
	Replace	X					
0502	Deflector, Shroud, Ect.						
	Shrouds						
	Replace	--	X				
0503	Lines and Fittings, Hoses, Pipes, Clamps, Etc.						
	Clamps, hose; cock, drain; hoses; radiator; lines; fittings						
	Replace	--	X				
0504	Water Pump						
	Pump, water						
	Replace	--	X				
0505	Fan Assembly						
	Belt, V						
	Adjust	X					
	Replace	--	X				
	Fan						
	Replace	--	X				
0506	Thermostats and Gaskets, Etc.						
	Thermostat						
	Test	--	X				
	Replace	--	X				

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
06	ELECTRICAL SYSTEM						
0601	Generator						
	Generator						
	Test		X				
	Replace		X				
	Repair			X			
	Brushes						
	Replace		X				
0602	Generator, Regulator						
	Regulator, voltage						
	Adjust		X				
	Test		X				
	Replace		X				
0603	Starter						
	Starter						
	Service		X				
	Test		X				
	Replace		X				
	Repair			X			
	Switch, solenoid; brushes						
	Replace		X				
	Wiring						
	Replace		X				
	Repair		X				
0604	Ignition Components						
	Magneto						
	Adjust		X				
	Replace		X				
	Repair			X			
	Points; Condenser						
	Replace		X				
0606	Engine Safety Controls						
	Governor, overpseed						
	Adjust		X				
	Replace		X				
	Repair			X			
	Switch, temperature						
	Replace		X				
0607	Instrument or Engine Control Panel						
	Switch						
	Replace		X				
0608	Miscellaneous Items						
	Receptacle						
	Replace		X				
	Harness, wiring; cable						
	Repair		X				
0612	Batteries						
	Batteries						
	Service	X					
	Test		X				
	Replace		X				
	Cable, battery						
	Repair		X				
	Box, battery; cover						
	Replace		X				
15	FRAME						
1501	Frame Assembly						
	Pan, frame						
	Replace		X				

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
	Runner, skid						
	Replace	--	--	--	X		
17	BODY						
1703	Doors and Panels						
	Brackets; supports; covers						
	Replace	--	X				
1708	Stowage Racks						
	Rack, hose						
	Replace	--	X				
22	ACCESSORY ITEMS						
2210	Data Plates						
	Plates, data						
	Replace	--	--	X			
	Plates, instruction						
	Replace	--	X				
26	ACCESSORIES, PUBLICATIONS, AND TOOLS						
2602	Accessories						
	Accessories, unmounted						
	Replace	X					
2603	Common Tools						
	Tools, common						
	Replace	X					
2605	Publications						
	Publications						
	Replace	X					
47	GAGES AND MEASURING DEVICES						
4701	Instrument, Speed						
	Adapter, tachometer						
	Service	X					
	Replace	--	X				
	Tachometer						
	Replace	--	X				
4702	Gages, Mounting, Lines and Fittings						
	Gages; fittings						
	Replace	--	X				
	Tubing						
	Replace	--	X				
	Repair	--	X				
50	PNEUMATIC EQUIPMENT						
5000	Air Compressor Assembly						
	Compressor assembly						
	Service	X					
	Repair	--	--	X			
	Overhaul	--	--	--	X		
5001	Cylinder						
	Cylinders						
	Repair	--	--	--	X		
5004	Rotors						
	Bearings; seal; vanes; rotor shaft						
	Replace	--	--	--	X		
5006	Lubrication System						
	Valve assembly, bypass; pump, oil						
	Replace	--	--	X			
	Repair	--	--	X			
	Filter assembly, compressor oil						
	Service	X	--	--	--	--	Turn handle daily.
	Service	--	X	--	--	--	100-hr cleanout.

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
	Repair	--	X				
	Valve, bypass, oil; tubes						
	Replace	--	X				
5007	Compressor Drive						
	Gears						
	Replace	--	--	X			
5009	Unloader System Components						
	Unloader assembly						
	Replace	--	--	X			
	Repair	--	--	X			
	Valve, regulating						
	Adjust	--	X				
	Replace	--	X				
	Cock; fittings; valves						
	Replace	--	X				
	Lines						
	Replace	--	X				
	Repair	--	X				
5012	Thottling Devices						
	Regulator assembly, air						
	Adjust	--	X				
	Repair	--	--	X			
5014	Air Receiver						
	Cushion; strap						
	Replace	--	--	X			
	Fittings						
	Replace	--	X				
5015	Air Discharge System						
	Valve assembly, check						
	Replace	--	--	X			
	Repair	--	--	X			
	Valve; coupling, hose						
	Replace	--	X				
76	FIRE FIGHTING EQUIPMENT						
7603	Fire Extinguishers						
	Extinguisher, fire						
	Service	X					
	Replace	X					
	PART II						
01	ENGINE						
0100	Engine Assembly						
	Engine, gasoline						
	Service	X					
	Inspect	X					
	Test	--	X	--	--	--	Compression.
	Replace	--	--	X			
	Repair	--	X				
	Overhaul	--	--	--	X		
0101	Crankcase						
	Crankcase						
	Replace	--	--	--	X		
0108	Engine Lubrication System						
	Filter, oil						
	Service	X					
	Replace	--	X				
	Spring, pressure regulator; hoses, oil; fittings						
	Replace	--	X				

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
03	FUEL SYSTEM						
0302	Fuel Pumps						
	Pump, fuel						
	Service	X					
	Replace	--	X				
	Repair	--	X				
0304	Air Cleaner						
	Cleaner, air						
	Service	X					
	Replace	--	X				
0306	Tanks, Lines, Fittings						
	Cap, filler; transmitter; fittings						
	Replace	--	X				
	Tank, fuel						
	Service	X					
	Replace	--	X				
	Lines						
	Replace	--	X				
	Repair	--	X				
04	EXHAUST SYSTEM						
0401	Pipes						
	Pipe, muffler						
	Replace	--	X				
05	COOLING SYSTEM						
0501	Radiator						
	Core, radiator						
	Service	X					
	Inspect	X					
	Replace	--	--	X			
	Guard						
	Replace	--	X				
0502	Shroud						
	Shroud, wing						
	Replace	--	X				
0503	Fittings						
	Elbow, inlet						
	Replace	--	X				
06	ELECTRICAL SYSTEM						
0604	Ignition Components						
	Cable, spark plug						
	Replace	--	X				
	Plugs, spark						
	Service	--	X				
	Adjust	--	X				
	Test	--	X				
	Replace	--	X				
0606	Engine Safety Controls						
	Wire assembly						
	Repair	--	X				
0607	Instrument or Engine Control Panel						
	Ammeter; switches; bracket; panel, instrument						
	Replace	--	X				
	Wiring						
	Repair	--	X				
15	FRAME						
1501	Frame Assembly						
	Bail, lifting						
	Replace	--	X				

Functional group	Components and related operation	Echelons of maintenance 1	2	3	4	5	Remarks
	Frame						
	Replace	--	--	--	X		
17	BODY; HOOD						
1703	Doors and Panels						
	Covers; plate, housing; supports; housing, radiator panel						
	Replace	--	X				
1708	Boxes						
	Box, tool						
	Replace	--	X				
47	GAGES						
4702	Gages, Mounting, Lines and Fittings						
	Gages; fittings						
	Replace	--	X				
	Tubing						
	Replace	--	X				
	Repair	--	X				
50	PNEUMATIC EQUIPMENT						
5006	Lubrication System						
	Bracket, filter mounting						
	Replace	--	X				
	Cooler, oil						
	Repair	--	--	X			
5008	Air Intake						
	Elbow, bracket assembly; clamps; hose, air inlet						
	Replace	--	X				
5009	Unloader System Components						
	Filter assembly; cover; fittings						
	Replace	--	X				
	Lines						
	Replace	--	X				
	Repair	--	X				
5014	Air Receiver						
	Tank, oil separator						
	Service	X					
	Repair	--	--	X			
	PART III						
01	ENGINE						
0100	Engine Assembly						
	Engine, gasoline						
	Service	X					
	Inspect	X					
	Test	--	X	--	--	--	Compression.
	Replace	--	--	X			
	Repair	--	X				
	Overhaul	--	--	--	X		
0101	Crankcase						
	Crankcase						
	Replace	--	--	--	X		
0108	Engine Lubrication System						
	Filter, oil						
	Service	X					
	Replace	--	X				
	Bracket, mounting; spring, pressure regulator; hoses, oil; fittings; tubes; clamps						
	Replace	--	X				

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
03	FUEL SYSTEM						
0302	Fuel Pumps						
	Pump, fuel						
	Service	X					
	Replace	--	X				
0304	Air Cleaner						
	Cleaner, air						
	Service	X					
	Replace	--	X				
0306	Tanks, Lines, Fittings						
	Cab, filler; transmitter; fittings; strainer						
	Replace	--	X				
	Tank, fuel						
	Service	X					
	Replace	--	X				
	Lines						
	Replace	--	X				
	Repair	--	X				
0309	Fuel Filters						
	Strainer, fuel; bowl; filter assembly						
	Service	X					
	Replace	--	X				
04	EXHAUST SYSTEM						
0401	Pipes						
	Pipe, muffler						
	Replace	--	X				
05	COOLING SYSTEM						
0501	Radiator						
	Core, radiator						
	Service	X					
	Inspect	X					
	Replace	--	--	X			
	Guard; support						
	Replace	--	X				
0502	Shroud, Etc.						
	Shrouds; guards, fan						
	Replace	--	X				
0503	Fittings						
	Elbow, inlet						
	Replace	--	X				
0505	Fan Assembly						
	Guards						
	Replace	--	X				
06	ELECTRICAL SYSTEM						
0604	Ignition Components						
	Cable, spark plug						
	Replace	--	X				
	Plugs, spark						
	Service	--	X				
	Adjust	--	X				
	Test	--	X				
	Replace	--	X				
0606	Engine Safety Controls						
	Wire assembly						
	Repair	--	X				
0607	Instrument or Engine Control Panel						
	Ammeter; bracket; panel, instrument; switches; light						
	Replace	--	X				

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
	Wiring						
	Repair	--	X				
	Lamp						
	Replace	X					
15	FRAME						
1501	Frame Assembly						
	Frame						
	Replace	--	--	--	X		
	Bail, lifting						
	Replace	--	X				
17	BODY; HOOD						
1703	Doors and Panels						
	Covers; plate housing; supports; housing, radiator panel						
	Replace	--	X				
1708	Boxes						
	Box, tools						
	Replace	--	X				
22	ACCESSORIES, ITEMS						
2210	Data Plates						
	Plate, instruction						
	Replace	--	X				
47	GAGES						
4702	Gages, Mounting, Lines and Fittings						
	Gages; fittings						
	Replace	--	X				
	Tubing						
	Replace	--	X				
	Repair	--	X				
50	PNEUMATIC EQUIPMENT						
5006	Lubrication System						
	Bracket, filter mounting						
	Replace	--	X				
	Cooler, oil						
	Repair	--	--	X			
5008	Air Intake						
	Bracket, filter; clamps; manifold, inlet; hoses						
	Replace	--	X				
5009	Unloader System Components						
	Filter assembly; cover; fittings; valve, relief						
	Replace	--	X				
	Lines						
	Replace	--	X				
	Repair	--	X				
5014	Air Receiver						
	Tank, oil separator						
	Service	X					
	Repair	--	--	X			
	Valve, globe						
	Replace	--	X				

APPENDIX III

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. General

Section II lists the accessories, tools, and publications required in 1st echelon maintenance and operation, initially issued with, or authorized for the compressor. Section III lists the maintenance and operating supplies required for initial operation.

2. Explanation of Columns Contained in Section II

a. Source Codes. The information provided in each column is as follows:

(1) *Technical service.* This column lists the basic number of the technical service assigned supply responsibility for the part. Blank spaces denote Corps of Engineers supply responsibility. General Engineer supply parts are identified by the letters GE in parentheses, following the nomenclature in the description column. Other technical services basic numbers are—

3—Chemical Corps
9—Ordnance Corps
10—Quartermaster Corps
12—Adjutant General's Corps

(2) *Source.* The selection status and source of supply for each part are indicated by one of the following code symbols:

(*a*) P—applied to high-mortality repair parts which are stocked in or supplied from the technical service depot system and authorized for use at indicated maintenance echelons.

(*b*) P1—applied to repair parts which are low-mortality parts, stocked in or supplied from technical service depots, and authorized for installation at indicated maintenance echelons.

(3) *Maintenance.* The lowest maintenance echelon authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O—Organizational Maintenance (1st and 2d echelon)

b. Federal Stock Numbers. The Federal stock number shown in this column will be used for requisitioning purposes.

c. Description.

(1) The item name and a brief description of the part are shown.

(2) The letters GE, shown in parentheses immediately following the description, indicate general engineer supply responsibility for the part.

d. Unit of Issue. If no abbreviation is shown in this column, the unit of issue is "each".

e. Quantity Authorized. This column lists the quantities or repair parts, accessories, tools, or publications authorized for issue to the equipment operator or crew as required.

f. Quantity Issued with Equipment. This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned through normal supply channels as required.

3. Explanation of Columns Contained in Section III

a. Item. This column contains numerical sequenced item numbers, assigned to each component application, to facilitate reference.

b. Component Application. This column identifies the component application of each maintenance or operating supply item.

c. Source of Supply. This column lists the basic number of the technical service assigned supply responsibility for the item. Blank spaces denote Corps of Engineers supply responsibility. Other technical services basic numbers are—

9—Ordnance Corps

10—Quartermaster Corps

d. Federal Stock Number. The Federal stock number shown in this column will be used for requisitioning purposes.

e. Description. The item name and a brief description are shown.

f. Quantity Required for Initial Operation. This column lists the quantity for each maintenance or operating supply item required for initial operation of the equipment.

g. Quantity Required for 8 Hours Operation. Quantities listed represent the estimated requirements for an average 8 hours of operation.

h. Notes. This column contains informative notes keyed to data appearing in the preceding column.

4. Comments and Suggestions

Suggestions and recommendations for changes to the Basic Issue Items List shall be submitted on DA Form 2028 to the Commanding Officer, U.S. Army Mobility Support Center, ATTN: SMOMS–MS, P.O. Box 119, Columbus 16, Ohio. Direct communication is authorized.

Section II. BASIC ISSUE ITEMS LIST

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
					GROUP 06—ELECTRICAL SYSTEM						
					0612—BATTERIES						
9	P	O	--	6140–057–2554	BATTERY STORAGE: 12 v	----	----	2	2		
3	P	O	--	6810–249–9354	SULPHURIC ACID: electrolyte	Gal	----	4	4		
					GROUP 26—ACCESSORIES, PUBLICATIONS AND TOOLS						
					2602—ACCESSORIES						
10	P	O	--	7520–559–9618	CASE, MAINTENANCE AND OPERATIONAL MANUALS: cotton duck, water-repellent, mildew-resistant MIL–B–11743–B.	----	----	1	1		
					2603—COMMON TOOLS						
10	P	O	--	4930–274–5713	OILER, HAND: 5 oz capacity	----	----	1	•		
10	P	O	--	5120–223–7396	PLIERS, SLIPJOINT: straight nose type, combination with cutters, 6 in. lg.	----	----	1	•		
10	P	O	--	5120–277–9491	SCREWDRIVER, FLAT TIP: wood handle, flared tip, ¼ in. width, 4 in. lg blade.	----	----	1	•		
10	P	O	--	5120–240–5328	WRENCH, OPEN END, ADJUSTABLE: single head, $\frac{15}{16}$ in. jaw opening, 8 in. lg.	----	----	1	•		
					2605—PUBLICATIONS						
12	P	O	--	-------------	Department of the Army Operator and Organizational Field and Depot Maintenance Manual TM 5–4310–221–15.	----	----	2	2		
12	P	O	--	-------------	Department of the Army Organizational Maintenance Repair Parts and Special Tool Lists TM 5–4310–221–20P.	----	----	2	2		
12	P	O	--	-------------	Department of the Army Lubrication Order LO 5–4310–221–15.	----	----	1	1		
					GROUP 76—FIRE FIGHTING EQUIPMENT						
					7603—FIRE EXTINGUISHERS						
	P1	O	--	4210–555–8837	Extinguisher, Fire, Monobromotrifluoromethane: charged, hand shatterable cylinder, penetrating seal valve, stored pressure, w/bracket, 2.75 lb (Halon-1301) MIL–SPEC E–52031 (GE).	----	----	1	1		

Section III. MAINTENANCE AND OPERATING SUPPLIES

Item	Component application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
1	0101 CRANKCASE, ENGINE (1).			OIL, LUBRICATING: 5-gal pail as follows:			(1) Includes quantity of oil to fill engine oil system as follows: 4½ qt—crankcase 1 qt—oil filter
		10	9150-265-9428	OE-10	5½ qt	(2)	
		10	9150-265-9435	OE-30	5½ qt	(2)	
		10	9150-242-7603	OES	5½ qt	(2)	
2	0304 CLEANER, AIR			OIL, LUBRICATING (3)	1¾ qt (4) 3½ qt (4)	(2)	(2) See current LO for grade application and replenishment intervals.
3	0306 TANK, FUEL			GASOLINE, AUTOMOTIVE: bulk as follows:			
		10	9130-160-1818	91A.	24 gal (5)	25.76 gal (6)	
4	0501 RADIATOR			WATER:	4 gal (7)		(3) Use oil as prescribed in item 6.
				ANTIFREEZE:			
		9	6850-224-8730	5-gal can as follows: Ethylene glycol;	(8)	(8)	(4) On serial Nos. 125CR22346 through 125CR22545 quantity—1¾ qt. On serial Nos. 125CR24901 through 125CR25400 quantity—3½ qt.
				55-gal drum as follows:			
		9	6850-174-1806	Compound, arctic.	(8)	(8)	(5) Tank capacity.
5	4701 TACHOMETER DRIVE.			GREASE, AUTOMOTIVE AND ARTILLERY:	as required	(2)	(6) Average fuel consumption is 3.22 gph of continuous operation.
		10	9150-190-0904	1-lb can as follows: GAA.			
6	5014 AIR RECEIVER			OIL, LUBRICATING: 5-gal pail as follows:			(7) Cooling system capacity.
		10	9150-242-7603	OES	5 gal	(2)	
		10	9150-582-5480	55-gal drum as follows: 2110 TH.	5 gal	(2)	(8) See table I for quantity, specific gravities, and replenishment data.

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By Order of the Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff

Official:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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  - 5–262 (5)
  - 5–267 (1)
  - 5–278 (5)
  - 5–279 (2)
  - 5–600 (2)
  - 5–627 (2)
  - 9–377 (2)
  - 39–51 (2)
  - 55–38 (2)
  - 55–140 (2)
  - 55–225 (2)
  - 55–227 (2)
  - 55–235 (2)
  - 55–237 (2)
  - 55–247 (2)
  - 55–500 (IE) (2)

NG: State AG (3).

USAR: Units—same as Active Army except allowance is one copy each unit.

For explanation of abbreviations used, see AR 320–50.

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